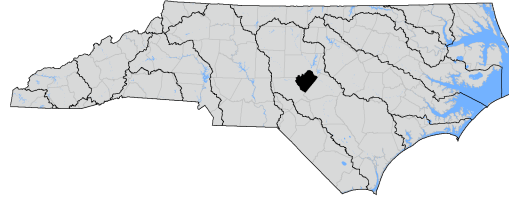


# PRELIMINARY FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

A Report of Flood Hazards in  
**LEE COUNTY, NORTH  
CAROLINA AND  
INCORPORATED AREAS**



Community Name	Community Number
CITY OF SANFORD	370143
LEE COUNTY	370331
TOWN OF BROADWAY	370552



**PRELIMINARY: 8/30/2013**

**REVISED: 2/21/2014**

**Federal Emergency Management Agency**

**State of North Carolina**

**Flood Insurance Study Number**

**37105CV000**

**[www.fema.gov](http://www.fema.gov) and [www.ncfloodmaps.com](http://www.ncfloodmaps.com)**



# FOREWORD

This countywide Flood Insurance Study (FIS) Report was produced through a unique cooperative partnership between the State of North Carolina and the Federal Emergency Management Agency (FEMA). The State of North Carolina has implemented a long-term approach to floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map floodplain areas at the state level. As a part of this effort, the State of North Carolina has joined with FEMA in a Cooperating Technical State (CTS) agreement to produce and maintain this FIS Report and the accompanying digital Flood Insurance Rate Map (FIRM) for North Carolina.

## NOTICE TO FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

The following is a list of the publication dates of this Countywide FIS Report starting with the initial Report accompanying the North Carolina Statewide FIRM:

Date	Reason
9/6/2006	Initial Countywide FIS Report Effective Date

This FIS has been produced as part of the North Carolina Floodplain Mapping Program. Lee County, North Carolina, falls under the administrative jurisdiction of Region IV of the Federal Emergency Management Agency (FEMA). Questions concerning this FIS may be directed to the North Carolina Floodplain Mapping Program at [www.ncfloodmaps.com](http://www.ncfloodmaps.com), the FEMA Map Assistance Center by calling the toll-free information line at 1-877-FEMA MAP (1-877-336-2627), or by contacting the FEMA Regional Office at the following address:

**FEMA, Federal Insurance and Mitigation Administration**  
**Koger Center - Rutgers Building**  
**3003 Chamblee Tucker Road**  
**Atlanta, Georgia 30341**  
**(770) 220-5400**

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# 1.0 Introduction

## 1.1 The National Flood Insurance Program

In 1968, Congress created the National Flood Insurance Program (NFIP) in response to the rising cost of taxpayer-funded disaster relief for flood victims and the increasing amount of damage caused by floods. The NFIP makes federally backed flood insurance available in communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage. Federally backed flood insurance is available in more than 19,000 communities across the United States and its territories.

The NFIP is managed by the Federal Insurance and Mitigation Administration of the Federal Emergency Management Agency (FEMA). The Federal Insurance and Mitigation Administration manages the insurance component of the NFIP and oversees the flood hazard mapping and the floodplain management aspects of the program.

The NFIP, through involvement with communities, the insurance industry, and the lending industry, helps reduce flood damage by nearly \$800 million a year. Further, buildings constructed in compliance with NFIP building standards suffer approximately 80% less damage annually than those not built in compliance. In addition, every \$3 paid in flood insurance claims saves \$1 in disaster assistance payments. The NFIP is self-supporting for the average historical loss year, which means that operating expenses and flood insurance claims are not paid by the taxpayer, but through premiums collected for flood insurance policies.

Additional information of interest to homeowners, community officials, insurance companies, lenders, and study contractors is available in Section 9.0 of this FIS Report and on the NFIP Internet homepage at <http://www.fema.gov/business/nfip/>.

## 1.2 Purpose of this Flood Insurance Study

Flood Insurance Studies (FISs) are one of the primary means by which the NFIP administers the National Flood Insurance Act of 1968, the Flood Disaster Protection Act of 1973, and the National Flood Insurance Reform Act of 1994. FISs develop flood risk data that are used to establish actuarial flood insurance rates. The information in this FIS Report will also be used by Lee County and the jurisdictions therein (hereinafter referred to collectively as Lee County) to facilitate the adoption and maintenance of floodplain management ordinances, which form the basis of communities' continued participation in the NFIP. Minimum requirements for participation in the NFIP are set forth in Title 44, Part 60, Section 3 of the Code of Federal Regulations (44 CFR 60.3). In some States and/or communities, floodplain management criteria or regulations may exist that are more restrictive than the minimum Federal requirements. In such cases, the more restrictive criteria will take precedence, and the State and/or community (or other jurisdictional agency) will be able to explain them.

This FIS investigates the existence and severity of flood hazards in, or revises and updates previous FISs for, the geographic area of Lee County, North Carolina, including the jurisdictions listed in Table 1.

**Table 1 - Jurisdictions in Lee County**

Community	Included in this FIS	If Not Included, Location of Flood Hazard/Flood Insurance Rate Data
CITY OF SANFORD	Yes	*
LEE COUNTY	Yes	*
TOWN OF BROADWAY	Yes	*

## 1.3 FIS Components

A Flood Insurance Study (FIS) is an analysis of flood hazards, typically presented as a set of Flood Insurance Rate Map (FIRM) panels and the FIS Report, which includes a set of Flood Profiles and/or Water-surface elevation rasters.

### Flood Insurance Study Report

The FIS Report provides a context for the information shown on the FIRM, as well as a summary of the data upon which the analyses are based. It also includes an index of sources of additional information on the NFIP.

## 2.0 Floodplain Management Applications

Flood events of a magnitude expected to occur with a 10%, 2%, 1%, or 0.2% annual chance have been selected as having special significance for developing sound floodplain management programs. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10%, 2%, 1%, and 0.2% chance, respectively, of being equaled in any given year. Therefore, FIS Reports typically determine water-surface elevations for floods with these probabilities. The FIRM delineates 1% and 0.2% annual chance floodplains and 1% annual chance floodway boundaries, and depicts 1% annual chance flood elevations, rounded to the nearest foot, to assist in developing floodplain management measures.

### 2.1 Floodplains

To provide a national standard without regional discrimination, the 1% annual chance flood has been adopted by FEMA as the base flood for floodplain management purposes. A 1% annual chance flood, or base flood, is defined as that having a 1% chance of being equaled or exceeded in any given year. The 1% annual chance floodplains shown on the FIRM identify areas that are expected to be inundated by the 1% annual chance flood. This 1% annual chance floodplain is also called a Special Flood Hazard Area (SFHA), where the NFIP's floodplain management regulations must be enforced by the community as a condition of participation in the NFIP. The 0.2% annual chance floodplain is employed to indicate additional areas of flood risk associated with exceptionally severe floods.

### 2.2 Floodways

Encroachment on floodplains such as that caused by placement of structures and fill reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, floodways are provided as a tool to assist local communities in this aspect of floodplain management. Under this concept, the 1% annual chance riverine floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. Figure 1, "Floodway Schematic," illustrates this principle. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this FIS are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional encroachment studies.

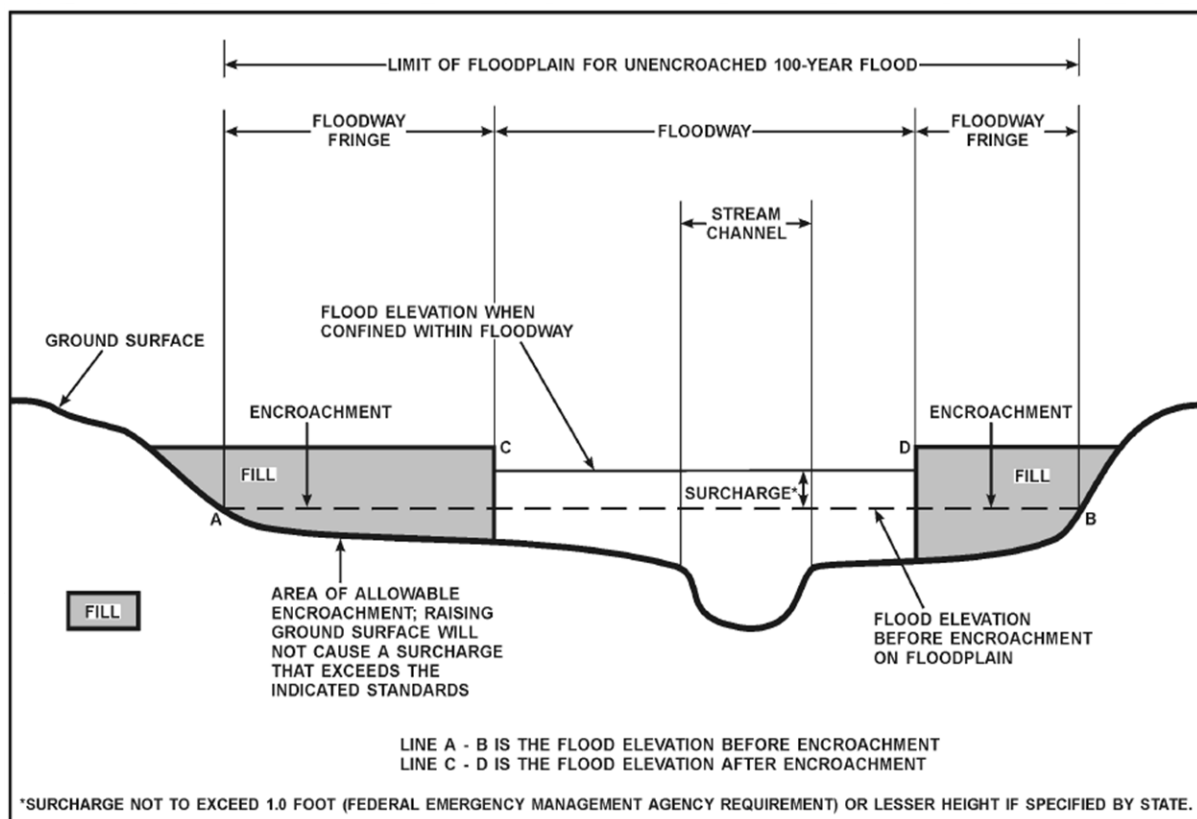


Figure 1- Floodway Schematic

## 2.3 Base Flood Elevations

The hydraulic characteristics of flooding sources were analyzed to provide estimates of the elevations of floods of the selected recurrence intervals. The Base Flood Elevation (BFE) is the elevation of the 1% annual chance flood. These BFEs are most commonly rounded to the whole foot, as shown on the FIRM, but in certain circumstances or locations they may be rounded to 0.1 foot. Cross section lines shown on the FIRM may also be labeled with the BFE rounded to 0.1 foot. Whole-foot BFEs derived from engineering analyses that apply to coastal areas, areas of ponding, or other static areas with little elevation change may also be shown at selected intervals on the FIRM. Cross sections with BFEs shown on the FIRM correspond to the cross sections shown in the Floodway Data table and Flood Profiles in this FIS Report. BFEs are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM.

## 2.4 Watershed Characteristics

Because a FIS is a probability analysis that may not account for some of the factors listed below, communities are strongly encouraged to consider adopting more restrictive or higher floodplain management criteria or ordinances than the minimum Federal requirements. Communities may also increase the validity of their flood hazard data by investing in continuous maintenance of river gages (see the Data Validity and Reliability paragraph below). If the U.S. Geological Survey (USGS) or other agencies do not maintain gages on the flooding sources of interest, partnerships with the USGS may be pursued, or local gages may be installed. For more information, see Section 9.0 of this report.

This flood hazard study represents an analysis of certain watershed characteristics, some of which are summarized as follows:

### Drainage Area

In general, streams that drain larger areas have greater flood hazards. FISs, in North Carolina, do not typically analyze flood hazards in places with rural drainage areas of less than one square mile and within urban drainage areas of less than ½ square mile.

### Soil Permeability and Infiltration

Differences in the types of soil and the amount of vegetation in a watershed have a significant effect on the amount of water that the soil can absorb; soils with a high sand content absorb much more water than soils with a high clay content. The presence of vegetation increases infiltration; the presence of pavement decreases infiltration and also speeds runoff to receiving waters. As soil permeability and infiltration decrease, the volume and rate of overland flow increases.

### Soil Moisture Conditions

In addition to soil permeability and infiltration, the level of the water table helps determine the saturation point, beyond which no water is absorbed. As rainfall duration increases, the height of the water table increases.

### Channel and Floodplain Geometry

The geometric contour of a streambed, termed channel geometry, and the geometric contour of a floodplain determine the volume of water that a channel can hold and partially determine the rate at which water flows through it.

### Channel and Floodplain Roughness

The roughness of a surface affects the characteristics of runoff whether the water is on the surface of the watershed or in the channel.

FIS Reports include analyses of how these factors will combine to produce overland flow patterns during floods that have a certain probability of occurring in any given year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at shorter intervals or even within the same year. The risk of experiencing a rare flood increases when longer periods are considered. For example, the risk of having a flood which equals or exceeds the 1% annual chance flood (1% chance of annual exceedence) in any 50-year period is approximately 40% (4 in 10), but for any 90-year period, the risk increases to approximately 60% (6 in 10).

It is important to note that the 1% annual chance flood is used as the national standard to allow a consistent approach to floodplain management, flood hazard assessment, and flood hazard mapping. In any given community, a number of factors may result in flooding characteristics that do not conform to predicted conditions. Therefore, the determination that an area is not shown on the FIRM as being within a Special Flood Hazard Area is no guarantee that it will not flood during a 1% annual chance flood. Examples of these factors include Data Validity and Reliability; Developmental and Topographic Changes Over Time; Erosion, Deposition, and Debris Flow; and Meandering and Lateral Migration.

### Data Validity and Reliability

Certain types of analysis methods yield more justifiable characterizations of flood hazards. For example, a gage analysis, to determine peak discharges, is based on actual measurements of watershed conditions over time and, therefore, is typically considered the most accurate method of hydrologic

analysis. However, it is not feasible to install enough gages to gather data on every stream. In addition, for many of the gage sites that do exist, there are interruptions in the period of record. The usefulness of gage data for the purpose of predicting flooding behavior decreases with interruptions in the period of record; predicted flooding conditions over a 100-year period based on 20 years of measurements spread over a 35-year period are less valid than those based on 30 years of continuous measurements. A regression analysis is typically considered the best method in the absence of gage data, as it uses gage data from watersheds with similar characteristics to estimate flood frequency and magnitude in an ungaged watershed. Regression equations reflect average conditions for a region; therefore, the results will not exactly match the results of a gage analysis at a particular location. The standard errors of the North Carolina rural regression equations range from 44 to 51 percent for estimates of the 1% annual chance flood. That means the difference between the results of the regression equation and the gage analysis for approximately two-thirds of the locations that gage data exists are within 44 to 51 percent of the gage analysis results. A rainfall-runoff hydrologic analysis may be used for gaged or ungaged watersheds, and can estimate the effects of storage areas and flood control structures and measures. This method is most valid when calibrated against historical data.

### Developmental and Topographic Changes Over Time

A FIRM is based on the best topographic and planimetric information available to FEMA and the State of North Carolina at the time the study is produced. In time, however, development and/or natural phenomena can alter the physical characteristics of a watershed and its drainage channels, resulting in changes in the flood hazards in those areas. For example, constructing a housing subdivision reduces the amount of soil that is available to absorb water; this in turn causes an increase in the volume of surface water that flows into the channel.

### Erosion, Deposition, and Debris Flow

The flood hazards shown on a FIRM are based on the assumption of unobstructed flow. The FIRM does not reflect an analysis of areas that are subject to erosion caused by the increased water-surface elevations and velocities that occur during flooding. In addition to the risks of landslides or a weakening of the ground underneath roads or structures, any sediment that is removed from one location will be deposited in another; accumulated deposits may have a pronounced effect on flood hazards in those areas. Similarly, debris such as fallen trees or branches, litter, or other items may obstruct stream channels or hydraulic structures, increasing water-surface elevations, velocities, and floodplain width.

### Meandering and Lateral Migration

FISs are based on the assumption that channel geometry will remain stable during normal drainage and during flood events. This assumption is valid for most streams, which flow over bedrock or between bedrock outcroppings that form non-alluvial channels. However, alluvial streams change the channel geometry with time, significantly so during flood events. Alluvial streams are subject to erosion and deposition, which may result in braided or meandering channels. Streams of this type may be characterized by lateral migration, or channel shifting, in which the stream may change course entirely during a flood. Whenever clear evidence is available, a FIRM will identify the alluvial nature of a studied flooding source and designate wider floodways to allow for potential migration. However, these floodways are based on qualitative assessments and not on quantitative geomorphic and engineering analyses.

## 3.0 Insurance Applications

For flood insurance applications, the FIRM designates flood insurance rate zones and, in 1% annual chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies. Table 2, "Flood Zone Designations," includes a description of each type of flood hazard zone.

**Table 2 - Flood Designations**

Zone	Description
A	Zone A is the flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined in the FIS Report by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no Base Flood Elevations or depths are shown within this zone.
AE	Zone AE is the flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined in the FIS Report by detailed methods. In most instances, whole-foot Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.
AH	Zone AH is the flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.
AO	Zone AO is the flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

AR	Zone AR is the flood insurance rate zone that corresponds to areas that were formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
A99	Zone A99 is the flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No Base Flood Elevations or depths are shown within this zone.
V	Zone V is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no Base Flood Elevations are shown within this zone.
VE	Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Whole-foot Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.
X	Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2% annual chance floodplain, areas within the 0.2% annual chance floodplain, and to areas of 1% annual chance flooding where average depths are less than 1 foot, areas of 1% annual chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1% annual chance flood by levees. No Base Flood Elevations or depths are shown within this zone.
X (Future)	Zone X (Future Base Flood) is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined based on future-conditions hydrology. No BFEs or base flood depths are shown within this zone.
D	Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

## 3.1 Coastal Barrier Resources System

This section is not applicable to this FIS project.

## 4.0 Area Studied

Lee County is found in the Piedmont region of North Carolina. It is surrounded by Chatham County to the north, Harnett County to the east, and Moore County to the southwest.

## 4.1 Basin Description

Table 3, "Basin Description" contains a description of the characteristics of the HUC-8 sub-basins within which each community falls. The table includes the main flooding sources within each basin, a brief description of the basin, and its area.

**Table 3 - Basin Description**

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description	HUC Area (square miles)
Deep	03030003	Deep River	The Deep River Basin flows out of southeast Forsyth County. From there it continues southeast, draining parts of Guilford, Randolph, Moore, and Lee Counties before emptying into the Cape Fear River in Chatham County.	1,450
Upper Cape Fear	03030004	Cape Fear River	The Upper Cape Fear Basin begins just downstream of B. Everett Jordan Lake in Chatham County flowing through low, rolling hills until exiting in Cumberland County.	1,630

## 4.2 Principal Flood Problems

Table 4, "Principal Flood Problems" is not applicable in Lee County.

## 4.3 Historic Flood Elevations

Table 5, "Historic Flood Elevations" is not applicable in Lee County.

## 4.4 Flood Protection Measures

Flood protection measures may be structural (such as levees, dams, and reservoirs) or non-structural (such as land-use management ordinances, policies, or practices).

Table 6, "Non-Levee Flood Protection Measures" is not applicable in Lee County.

Table 7, "Levees" is not applicable in Lee County.

## 4.5 Scope of Study

For this map maintenance revision, a scoping meeting was held in Lee County to present the results of initial research to the county and communities within the county and to discuss their floodplain mapping needs. The county and communities were asked to provide input on proposed study priorities and analysis methods. These meetings resulted in the identification of flooding sources having a floodplain mapping need. Map Maintenance Plans were developed based on the results of the scoping meetings and were both mailed to each jurisdiction within Lee County and posted to the State's website at [www.ncfloodmaps.com](http://www.ncfloodmaps.com).

Draft basin plans were developed based on the results of the initial scoping meetings. Final scoping meetings were held by the State and FEMA to provide counties and communities an overview of the draft basin plans, including the proposed scope and schedule for the project, and to provide an opportunity for additional county and community input. After the final scoping meeting was held, the Final Basin Plans were produced.

This FIS covers the geographic area of Lee County, North Carolina, and all jurisdictions therein. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction. Limits of detailed study are indicated on the Flood Profiles and/or Water-surface elevation rasters and/or the FIRM.

Table 8P, "Scope of Revisions: Revised or New Detailed Study - Preliminary" is not applicable in Lee County.

Table 9P, "Scope of Revisions: Redelineated - Preliminary" is not applicable in Lee County.

Table 10P, "Scope of Revisions: Limited Detailed - Preliminary" is not applicable in Lee County.

Table 8, "Flooding Sources Studied by Detailed Methods", lists all flooding sources within the county that were studied by detailed methods for this FIS and previous FISs.

**Table 8 - Flooding Sources Studied by Detailed Methods: Revised or Newly Studied**

Source	Riverine Sources		Affected Communities
	From	To	
Big Buffalo Creek	At the confluence with Deep River	Approximately 0.4 mile upstream of Carbonton Road	City Of Sanford Lee County
Little Buffalo Creek	At the confluence with Deep River	Approximately 1,000 feet upstream of US Hwy 421/NC 87	City Of Sanford Lee County

Table 9, "Flooding Sources Studied by Detailed Methods: Redelineated" is not applicable in Lee County.

Table 10, "Flooding Sources Studied by Detailed Methods: Limited Detailed", lists all flooding sources within the county that were studied by limited detailed methods for either this FIS or previous FISs.

**Table 10 - Flooding Sources Studied by Detailed Methods: Limited Detailed**

Source	Riverine Sources		Affected Communities
	From	To	
Bush Creek	At the confluence with Cape Fear River	Approximately 3.7 miles upstream of confluence with Cape Fear River	Lee County
Bush Creek Tributary 1	At the confluence with Bush Creek	Approximately 1,000 feet upstream of Poplar Springs Church Road	Lee County
Cape Fear River	At the Lee/Harnett County boundary	At the confluence of Deep River	Lee County
Cape Fear River Tributary 1	At the confluence with Cape Fear River	Approximately 1.3 miles upstream of Poplar Springs Church Road	Lee County
Copper Mine Creek	At the confluence with Hughes Creek and Gum Fork Creek	Approximately 0.6 mile upstream of Farrell Road	Lee County
Deep River	The confluence with Cape Fear River	The Chatham/Moore County boundary	City Of Sanford Lee County
Deep River	The Moore/Chatham County boundary	The Moore/Randolph County boundary	Lee County

**Table 10 - Flooding Sources Studied by Detailed Methods: Limited Detailed**

Source	Riverine Sources		Affected Communities
	From	To	
Deep River Tributary 1	At the confluence with Deep River	Approximately 1.4 miles upstream of confluence of Deep River Tributary 3	City Of Sanford Lee County
Deep River Tributary 2	At the confluence with Deep River Tributary 1	Approximately 0.8 mile upstream of confluence with Deep River Tributary 1	Lee County
Deep River Tributary 3	At the confluence with Deep River Tributary 1	Approximately 1.0 mile upstream of confluence with Deep River Tributary 1	Lee County
Deep River Tributary 9	At the confluence with Deep River	Approximately 0.8 mile upstream of confluence with Deep River	Lee County
Fall Creek	At the confluence with Cape Fear River	Approximately 0.4 mile upstream of Copeland Road	Lee County
Gum Fork Creek	At the confluence with Copper Mine Creek and Hughes Creek	Approximately 1.3 miles upstream of US-1	Lee County
Hughes Creek	At the confluence with Lick Creek	At the confluence of Copper Mine Creek and Gum Fork Creek	Lee County
Hughes Creek Tributary 1	At the confluence with Hughes Creek	Approximately 0.5 mile upstream of Cletus Hall Road	Lee County
Lick Creek	At the confluence with Cape Fear River	Approximately 1.0 mile upstream of Pumping Station Road	City Of Sanford Lee County
Lick Creek Tributary 1	At the confluence with Lick Creek	Approximately 0.6 mile upstream of Cletus Hall Road	Lee County
Little Pocket Creek	At the confluence with Pocket Creek	Approximately 1.2 miles upstream of McPherson Road	Lee County
Little Shaddox Creek	At the confluence with Cape Fear River	Approximately 450 feet upstream of Lower Moncure Road	Lee County
Lonnie Wombles Creek	At the confluence with Cape Fear River	Approximately 0.6 mile upstream of US-1	Lee County
Lonnie Wombles Tributary 1	At the confluence with Lonnie Wombles Creek	Approximately 0.9 mile upstream of US-1	Lee County
Lonnie Wombles Tributary 2	At the confluence with Lonnie Wombles Creek Tributary 1	Approximately 770 feet upstream of US-1	Lee County
Patterson Creek	At the confluence with Deep River	Approximately 1,600 feet upstream of Wicker Street	City Of Sanford Lee County
Pocket Creek	At the confluence with Deep River	Approximately 0.9 mile upstream of confluence of Racoon Creek	Lee County
Purgatory Branch	At the confluence with Big Buffalo Creek	Approximately 1.6 miles upstream of Forestwood Park Road	City Of Sanford Lee County
Smith Creek	At the confluence with Deep River	Approximately 1.0 mile upstream of Carbondon Road	Lee County

Table 11, "Stream Name Changes" is not applicable in Lee County.

Table 12, "Letters of Map Revision" is not applicable in Lee County.

## 5.0 Engineering Methods

For the flooding sources in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded at least once on the average during any 10-, 25-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 25-, 50-, 100-, and 500-year floods, have a 10-, 4-, 2-, 1-, and 0.2% annual chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedance) during the term of a 30-year mortgage is approximately 26 percent (about 3 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

### 5.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied. Hydrologic analyses are typically performed at the watershed level. Depending on factors such as watershed size and shape, land use and urbanization, and natural or man-made storage, various models or methodologies may be applied. For details on the county's hydrologic analyses, the hydrologic report is available by request.

A summary of the drainage area-peak discharge relationships for the flooding sources studied by detailed methods is shown in Table 13, "Summary of Discharges".

**Table 13 - Summary of Discharges**

Flooding Source		Discharges (cfs)			
Location	Drainage Area (square miles)	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
<b>Big Buffalo Creek</b>					
At the confluence with Deep River	20.30	3,040	4,730	5,290	6,850
Approximately 1.1 miles upstream of Cotten Road	17.80	2,960	4,580	5,100	6,560
<b>Bush Creek</b>					
Approximately 1,650 feet upstream of confluence of Bush Creek Tributary 1	5.70	*	*	2,207	*
Approximately 720 feet upstream of confluence of Bush Creek Tributary 1	5.70	*	*	2,217	*
<b>Bush Creek Tributary 1</b>					
Approximately 1,225 feet downstream of Lower River Road	0.80	*	*	624	*
Approximately 1.5 miles upstream of confluence with Bush Creek 3	0.80	*	*	662	*
Approximately 50 feet downstream of Lower River Road	0.60	*	*	542	*
Approximately 1,320 feet upstream of Lower River Road	0.50	*	*	506	*
Approximately 0.5 mile upstream of Lower River Road	0.40	*	*	447	*
Approximately 0.7 mile upstream of Lower River Road	0.40	*	*	399	*
Approximately 1,120 feet downstream of Poplar Springs Church Road	0.30	*	*	362	*
<b>Cape Fear River</b>					
Approximately 0.5 mile upstream of the Chatham/Harnett County boundary	3242.80	*	*	78,803	*
Approximately 50 feet upstream of confluence of Lick Creek	3218.00	*	*	77,399	*
Approximately 500 feet downstream of confluence of Lonnie Wombles Creek	3168.00	*	*	76,880	*
Approximately 1,640 feet downstream of Railroad	3166.80	*	*	77,399	*
Approximately 150 feet downstream of confluence of Deep River	3165.00	*	*	76,846	*
Approximately 0.9 mile downstream of the confluence of Deep River	3162.50	*	*	76,880	*
Approximately 150 feet downstream of confluence of Deep River	3155.30	*	*	76,846	*
<b>Cape Fear River Tributary 1</b>					
Approximately 1.5 miles upstream of confluence with Cape Fear River	2.20	*	*	1,228	*
Approximately 1.7 miles upstream of confluence with Cape Fear River	2.10	*	*	1,170	*
Approximately 40 feet downstream of Lower River Road	1.90	*	*	1,120	*
Approximately 1,660 feet upstream of Lower River Road	1.70	*	*	1,019	*
Approximately 0.7 mile upstream of Lower River Road	1.50	*	*	948	*
Approximately 0.9 mile upstream of Lower River Road	1.30	*	*	873	*
Approximately 1.1 miles upstream of Lower River Road	1.20	*	*	840	*
Approximately 1,150 feet downstream of Poplar Church Springs Road	1.10	*	*	784	*
Approximately 475 feet upstream of Poplar Church Springs Road	0.80	*	*	640	*
<b>Copper Mine Creek</b>					
At the confluence with Hughes Creek	8.80	*	*	2,906	*
Approximately 200 feet upstream of CSX railroad crossing	2.20	*	*	1,211	*
Approximately 400 feet downstream of Farrell Road	1.90	*	*	1,111	*
Approximately 1,100 feet upstream of Farrell Road	1.50	*	*	946	*
<b>Deep River</b>					
At the confluence with Cape Fear River	1451.80	*	*	54,900	*
Approximately 1.3 miles upstream of Lockville Hydro Dam	1445.90	*	*	54,600	*
Approximately 120 feet upstream of confluence of Rocky Branch 1	1435.90	*	*	54,500	*
Approximately 950 feet upstream of confluence of Rocky River	1191.60	*	*	53,200	*

**Table 13 - Summary of Discharges**

Flooding Source		Discharges (cfs)			
Location	Drainage Area (square miles)	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Approximately 1.2 miles upstream of confluence of Rocky River	1188.00	*	*	53,200	*
Approximately 280 feet upstream of confluence of Little Buffalo Creek	1176.00	*	*	53,100	*
Approximately 50 feet upstream of confluence of Georges Creek	1160.80	*	*	52,900	*
Approximately 100 feet upstream of Deep River Tributary 1	1157.90	*	*	52,900	*
Approximately 250 feet upstream of confluence of Big Buffalo Creek	1137.00	*	*	52,700	*
Approximately 150 feet upstream of Deep River Tributary 4	1136.20	*	*	52,700	*
Approximately 70 feet upstream of confluence of Cedar Creek	1121.80	*	*	52,600	*
Approximately 400 feet upstream of confluence of Patterson Creek	1113.60	*	*	52,500	*
Approximately 150 feet upstream of confluence of Pocket Creek	1074.60	*	*	52,000	*
Approximately 190 feet upstream of Deep River Tributary 5	1070.40	*	*	52,000	*
Approximately 95 feet upstream of Deep River Tributary 7	1067.70	*	*	51,900	*
At the confluence of Indian Creek (into Deep River)	1064.10	*	*	51,900	*
Approximately 100 feet upstream of confluence of Indian Creek	1040.90	*	*	51,600	*
Approximately 90 feet upstream of confluence of Smith Creek	1036.60	*	*	51,500	*
Approximately 190 feet upstream of confluence of Line Creek	1032.70	*	*	51,400	*
Approximately 190 feet upstream of confluence of Deep River Tributary 9	1029.50	*	*	51,400	*
<b>Deep River Tributary 1</b>					
At the confluence with Deep River	2.50	*	*	1,333	*
Approximately 260 feet upstream of confluence of Deep River Tributary 2	1.90	*	*	1,125	*
Approximately 60 feet upstream of confluence of Deep River Tributary 3	1.10	*	*	807	*
Approximately 0.5 mile upstream of confluence of Deep River Tributary 3	1.00	*	*	751	*
<b>Deep River Tributary 2</b>					
At the confluence with Deep River Tributary 1	0.50	*	*	509	*
<b>Deep River Tributary 3</b>					
At the confluence with Deep River Tributary 1	0.60	*	*	524	*
<b>Deep River Tributary 9</b>					
At the confluence with Deep River	0.80	*	*	659	*
<b>Fall Creek</b>					
At the confluence with Cape Fear River	8.70	*	*	2,883	*
Approximately 0.5 mile upstream of confluence with Cape Fear River	8.60	*	*	2,862	*
Approximately 1.0 mile upstream of confluence with Cape Fear River	8.30	*	*	2,790	*
Approximately 115 feet downstream of Buckhorn Road	7.80	*	*	2,698	*
Approximately 1,600 feet upstream of Buckhorn Road	7.20	*	*	2,561	*
<b>Gum Fork Creek</b>					
At the confluence with Hughes Creek	6.40	*	*	2,383	*
Approximately 100 feet downstream of Farrell Road	6.00	*	*	2,283	*
Approximately 1,770 feet upstream of Farrell Road	5.70	*	*	2,221	*
<b>Hughes Creek</b>					
Approximately 1,000 feet upstream of confluence of Hughes Creek Tributary 1	17.60	*	*	4,476	*
Approximately 0.9 mile upstream of Lower Moncure Road	9.80	*	*	3,101	*
Approximately 135 feet downstream of Ammons Farm Road	8.80	*	*	2,906	*
<b>Hughes Creek Tributary 1</b>					
At the confluence with Hughes Creek	0.50	*	*	461	*
Approximately 1,580 feet upstream of Cletus Hall Road	0.30	*	*	365	*

**Table 13 - Summary of Discharges**

Flooding Source		Discharges (cfs)			
Location	Drainage Area (square miles)	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
<b>Lick Creek</b>					
At the confluence with Cape Fear River	46.30	*	*	8,182	*
Approximately 250 feet upstream of confluence of Lick Creek Tributary 1	44.90	*	*	8,028	*
Approximately 150 feet upstream of confluence of Hughes Creek	26.40	*	*	5,764	*
<b>Lick Creek Tributary 1</b>					
Approximately 1,500 feet upstream of confluence with Lick Creek	0.40	*	*	391	*
Approximately 350 feet downstream of Norfolk Southern Railroad	0.30	*	*	344	*
Approximately 400 feet upstream of Cletus Hall Road	0.30	*	*	314	*
<b>Little Buffalo Creek</b>					
At the confluence with Deep River	8.10	1,830	2,920	3,270	4,260
Approximately 0.8 mile upstream of confluence with Deep River	7.60	1,810	2,880	3,230	4,180
Approximately 215 feet upstream of Dam	6.90	1,790	2,820	3,150	4,060
Approximately 0.6 mile upstream of Deep River Road	6.20	1,760	2,760	3,070	3,930
Approximately 350 feet upstream of US Hwy 1	5.10	1,670	2,600	2,890	3,660
<b>Little Pocket Creek</b>					
At the confluence with Pocket Creek	11.30	*	*	3,386	*
Approximately 1.7 miles upstream of confluence with Pocket Creek	10.40	*	*	3,209	*
<b>Little Shaddox Creek</b>					
Approximately 0.7 mile upstream of confluence with Cape Fear River	1.90	*	*	1,098	*
Approximately 1.1 miles upstream of confluence with Cape Fear River	1.70	*	*	1,025	*
Approximately 520 feet downstream of Lower River Road	1.40	*	*	937	*
Approximately 900 feet upstream of Lower River Road	1.30	*	*	877	*
Approximately 1,900 feet upstream of Lower River Road	1.20	*	*	851	*
At the confluence with Juniper Creek	1.20	*	*	816	*
Approximately 0.6 mile upstream of Lower River Road	1.00	*	*	740	*
Approximately 0.9 mile upstream of Lower River Road	0.80	*	*	639	*
Approximately 1.1 miles upstream of Lower River Road	0.50	*	*	477	*
Approximately 1.3 miles upstream of Lower River Road	0.40	*	*	436	*
Approximately 820 feet downstream of Lower Moncure Road	0.30	*	*	336	*
<b>Lonnie Wombles Creek</b>					
Approximately 1.7 miles upstream of confluence with Cape Fear River	6.30	*	*	2,349	*
Approximately 2.3 miles upstream of confluence with Cape Fear River	5.90	*	*	2,258	*
Approximately 1,550 feet downstream of Lower River Road	5.00	*	*	2,043	*
Approximately 600 feet upstream of Lower River Road	5.00	*	*	2,024	*
Approximately 0.4 mile upstream of Lower River Road	4.20	*	*	1,835	*
Approximately 100 feet downstream of Lower Moncure Road	1.20	*	*	813	*
Approximately 100 feet upstream of Lonnie Wombles Creek Tributary 1	1.20	*	*	835	*
Approximately 1,430 feet upstream of Lower Moncure Road	1.00	*	*	754	*
Approximately 1,800 feet upstream of CSX Railroad	0.70	*	*	580	*
Approximately 115 feet downstream of CSX Railroad	0.70	*	*	616	*
Approximately 0.6 mile upstream of CSX Railroad	0.60	*	*	537	*
Approximately 465 feet downstream of Goat Hill Lane	0.50	*	*	465	*
Approximately 1,500 feet upstream of Goat Hill Lane	0.10	*	*	129	*
<b>Lonnie Wombles Tributary 1</b>					

**Table 13 - Summary of Discharges**

Flooding Source		Discharges (cfs)			
Location	Drainage Area (square miles)	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
At the confluence with Lonnie Wombles Creek	3.00	*	*	1,487	*
Approximately 440 feet downstream of Lower Moncure Road	2.80	*	*	1,418	*
Approximately 0.7 mile upstream of Lower Moncure Road	2.40	*	*	1,293	*
Approximately 1.2 miles upstream of Lower Moncure Road	2.20	*	*	1,210	*
Approximately 1.4 miles upstream of Lower Moncure Road	1.30	*	*	887	*
Approximately 1.7 miles upstream of Lower Moncure Road	1.30	*	*	867	*
Approximately 2.0 miles upstream of Lower Moncure Road	1.10	*	*	795	*
Approximately 2.3 miles upstream of Lower Moncure Road	1.00	*	*	734	*
Approximately 2.5 miles upstream of Lower Moncure Road	0.90	*	*	683	*
Approximately 1,175 feet upstream of US 1	0.70	*	*	570	*
Approximately 125 feet downstream of US 1	0.70	*	*	616	*
Approximately 0.4 mile upstream of US 1	0.50	*	*	466	*
Approximately 0.6 mile upstream of US 1	0.10	*	*	187	*
<b>Lonnie Wombles Tributary 2</b>					
At the confluence with Lonnie Wombles Creek Tributary 1	0.80	*	*	630	*
Approximately 1,550 feet upstream of confluence with Lonnie Wombles Creek Tributary 1	0.70	*	*	601	*
Approximately 0.6 mile upstream of confluence with Lonnie Wombles Creek Tributary 1	0.60	*	*	513	*
Approximately 350 feet downstream of US 1	0.40	*	*	416	*
<b>Patterson Creek</b>					
Approximately 1.1 miles upstream of confluence with Deep River	6.50	*	*	2,408	*
Approximately 2.7 miles upstream of confluence with Deep River	5.80	*	*	2,229	*
Approximately 3.8 miles upstream of confluence with Deep River	4.80	*	*	1,980	*
Approximately 4.5 miles upstream of confluence with Deep River	3.90	*	*	1,734	*
<b>Pocket Creek</b>					
At the confluence with Deep River	37.60	*	*	7,192	*
Approximately 0.5 mile upstream of confluence with Deep River	36.70	*	*	7,078	*
Approximately 150 feet upstream of confluence of Little Pocket Creek	25.10	*	*	5,579	*
Approximately 1.9 miles upstream of confluence of Little Pocket Creek	24.30	*	*	5,474	*
<b>Purgatory Branch</b>					
At the confluence with Big Buffalo Creek	1.50	*	*	942	*
<b>Smith Creek</b>					
At the confluence with Deep River	3.60	*	*	1,670	*
Approximately 1.0 mile upstream of confluence with Deep River	2.90	*	*	1,455	*
Approximately 65 feet downstream of Carbondon Road	2.00	*	*	1,151	*

Table 14, "Summary of Stillwater Elevations" is not applicable in Lee County.

Table 15, "Gage Information" is not applicable in Lee County.

## 5.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the flood elevations for the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and/or Water-surface elevation rasters. For stream segments for which BFEs were computed, selected cross-section locations are also shown on the FIRM. Flood Profiles

and/or Water-surface elevation rasters were developed showing computed water-surface elevations for floods of the selected recurrence intervals.

Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles and/or Water-surface elevation rasters or in the Floodway Data tables in the FIS Report. For construction and/or floodplain management purposes, users are encouraged to use the flood elevation data presented in the FIS in conjunction with the data shown on the FIRM.

The hydraulic analyses for this FIS were based on unobstructed flow. The flood elevations shown on the Flood Profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

For details on the county's hydraulic analyses, the hydraulic report is available by request.

For the streams studied by detailed methods, water surface elevations of floods of the selected recurrence intervals were computed through use of the Army Corps of Engineers' HEC RAS step backwater computer program. The hydraulic analyses were based on unobstructed flow. The flood elevations shown on the Profiles and/or Water-surface elevation rasters are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail. The computer models were calibrated using historic high water data collected during field investigations.

The cross section geometries were obtained from a combination of digital elevation data obtained by Light Detection and Ranging (LIDAR) and field surveys. All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry. Natural floodplain cross sections were surveyed approximately every 4000 feet along the detail study reaches to obtain the channel geometry between bridges and culverts. Overbank cross section data for the backwater analyses were obtained from recently flown LIDAR data.

Channel roughness factors (Manning's "n") used in the hydraulic computations were made in the field by an engineer where stream access was possible, with orthophotos used to supplement areas that could not be accessed. The channel and overbank "n" values for all of the streams studied by detailed methods are shown in Table 16, "Roughness Coefficients".

**Table 16 - Roughness Coefficients**

Stream	Channel "n"	Overbank "n"
Big Buffalo Creek	0.042 to 0.052	0.080 to 0.160
Bush Creek	0.050	0.120 to 0.150
Bush Creek Tributary 1	0.050	0.150
Cape Fear River	0.030 to 0.059	0.050 to 0.666
Cape Fear River Tributary 1	0.050	0.120 to 0.150
Copper Mine Creek	0.050	0.120 to 0.150
Deep River	0.020 to 0.070	0.040 to 0.200
Deep River Tributary 1	0.045	0.130 to 0.150
Deep River Tributary 2	0.045	0.130 to 0.150
Deep River Tributary 3	0.045	0.130
Deep River Tributary 9	0.055	0.045 to 0.080
Fall Creek	0.048	0.110 to 0.150
Gum Fork Creek	0.050	0.120 to 0.150
Hughes Creek	0.050	0.110 to 0.150
Hughes Creek Tributary 1	0.050	0.150
Lick Creek	0.050	0.140
Lick Creek Tributary 1	0.050	0.120 to 0.150
Little Buffalo Creek	0.035 to 0.055	0.080 to 0.200
Little Pocket Creek	0.050	0.100 to 0.150
Little Shaddox Creek	0.045 to 0.050	0.120 to 0.150
Lonnie Wombles Creek	0.035 to 0.050	0.110 to 0.150
Lonnie Wombles Tributary 1	0.045 to 0.050	0.110 to 0.150
Lonnie Wombles Tributary 2	0.040	0.140
Patterson Creek	0.045	0.100 to 0.150
Pocket Creek	0.040 to 0.050	0.080 to 0.200
Purgatory Branch	0.050	0.100 to 0.150
Smith Creek	0.045 to 0.450	0.100 to 0.150

For flooding sources studied by limited detailed methods in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this report and the FIRM panels. This method entails developing a HEC-RAS hydraulic model, resulting in the calculation of BFEs and the delineation of the 1% annual chance floodplain (designated as Zone AE). Cross sections for the flooding sources studied by limited detailed methods were obtained using digital elevation data obtained with LIDAR technology developed as part of the North Carolina Statewide

Floodplain Mapping Program. The hydraulic model is prepared using this digital elevation data, without surveying bathymetric or structural data. Where bridge or culvert data are readily available, such as from the North Carolina Department of Transportation, these data have been reflected in the hydraulic model. If these structural data are not readily available, field measurements of these structures were made to approximate their geometry in the hydraulic models. In addition, this method does not include field surveys that determine specifics on channel and floodplain characteristics. A limited detailed study is a "buildable" product that can be upgraded to a fully detailed study at a later date by verifying stream channel characteristics, bridge and culvert opening geometry, and by analyzing multiple recurrence intervals.

The results of the HEC-RAS computations are tabulated for all cross sections (Table 17, "Limited Detailed Flood Hazard Data"). Flood Profiles have not been developed for streams studied by limited detailed methods. Water-surface elevation rasters were developed for streams studied by limited detailed methods. In addition, floodways for streams studied by limited detailed methods are not delineated on the FIRM. However, the 1% annual chance water-surface elevations, flood discharges, and non-encroachment widths from the limited detailed studies for every modeled cross section are given in Table 17. The non-encroachment widths given at modeled cross sections can be used by communities to enforce floodplain management ordinances that meet the requirement defined in 44 CFR 60.3(c)(10).

Between cross sections for streams studied by limited detailed methods, 1% annual chance water-surface elevations can be calculated by mathematical interpolation using the distance along the stream centerline. Non-encroachment widths and, therefore, the location of a non-encroachment area boundary between cross sections should be determined based on either 1) mathematical interpolation, or 2) the non-encroachment width at the upstream or downstream cross section, whichever is larger. If the width determined by this second method is wider than the Special Flood Hazard Area (SFHA) or the 1% annual chance floodplain delineated on the FIRM for this location along the stream, the non-encroachment area shall be considered to be coincident with the SFHA. A full detailed study incorporating field survey data in the HEC-RAS hydraulic model may be submitted for a Letter of Map Revision (LOMR) request to map a regulatory floodway along a section of a stream in lieu of applying the non-encroachment widths listed in Table 17.

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
<b>Bush Creek</b>				
028	2,757	2,217	169.8 <sup>1</sup>	96 / 111
031	3,109	2,217	169.8 <sup>1</sup>	96 / 82
037	3,691	2,207	169.8 <sup>1</sup>	133 / 142
044	4,410	2,207	169.8 <sup>1</sup>	182 / 111
052	5,219	2,207	169.8 <sup>1</sup>	315 / 13
<b>Bush Creek Tributary 1</b>				
081	8,090	662	171.7 <sup>1</sup>	5 / 148
087	8,731	624	171.7 <sup>1</sup>	34 / 4
091	9,137	624	173.2	16 / 15
096	9,624	624	176.6	8 / 20
097	9,688	542	180.0	8 / 20
102	10,168	542	182.2	15 / 70
106	10,648	542	188.2	5 / 41
112	11,214	506	192.5	3 / 60
115	11,501	506	194.1	10 / 25
116	11,621	506	195.6	10 / 25
121	12,127	506	198.4	6 / 10
126	12,575	447	203.3	5 / 17
131	13,105	447	208.0	6 / 17
136	13,604	399	212.2	15 / 13
142	14,241	399	216.0	6 / 28
149	14,866	362	220.5	4 / 10
<b>Cape Fear River</b>				
9810	981,000	79,004	152.2	455 / 732
9815	981,500	79,004	152.7	458 / 585
9820	982,000	79,004	153.2	421 / 442
9825	982,500	79,004	153.7	401 / 454

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
9830	983,000	79,004	154.2	404 / 433
9835	983,500	78,803	154.6	551 / 448
9840	984,000	78,803	155.2	888 / 462
9845	984,500	78,803	155.5	872 / 418
9850	985,000	78,803	156.0	922 / 364
9855	985,500	78,803	156.9	874 / 312
9860	986,000	78,803	157.8	865 / 268
9865	986,500	78,803	158.7	863 / 270
9870	987,000	78,803	159.6	989 / 254
9875	987,500	78,803	160.3	981 / 316
9880	988,000	78,803	161.1	1,537 / 233
9885	988,500	78,803	161.5	1,477 / 206
9889	988,915	78,803	161.9	1,051 / 262
9893	989,301	78,803	165.3	600 / 800
9896	989,647	78,803	165.4	412 / 361
9900	990,000	78,803	165.8	557 / 383
9905	990,500	78,803	166.1	718 / 305
9910	991,000	78,803	166.6	922 / 337
9915	991,500	78,803	166.8	843 / 206
9920	992,000	78,803	167.1	728 / 206
9925	992,500	78,803	167.4	756 / 206
9930	993,000	78,803	167.7	723 / 206
9935	993,500	78,803	168.1	882 / 241
9940	994,000	78,803	168.3	973 / 206
9945	994,500	78,803	168.5	911 / 206
9950	995,000	78,803	168.9	1,098 / 265
9955	995,500	78,803	169.2	1,493 / 303
9960	996,000	78,803	169.4	1,059 / 588
9965	996,500	78,803	169.6	870 / 814
9970	997,000	78,803	169.8	856 / 1,156
9975	997,500	78,803	170.2	1,571 / 1,461
9980	998,000	78,803	170.2	1,560 / 1,627
9985	998,500	78,803	170.4	746 / 1,813
9990	999,000	77,673	170.5	426 / 1,891
9995	999,500	77,673	170.7	301 / 2,095
10002	1,000,191	77,673	170.8	198 / 1,968
10003	1,000,295	77,673	170.8	700 / 700
10003	1,000,345	77,673	171.2	700 / 700
10010	1,001,000	77,673	171.7	198 / 2,836
10015	1,001,500	77,673	171.8	280 / 2,806
10020	1,002,000	77,673	171.9	198 / 2,455
10025	1,002,500	77,673	172.0	254 / 1,975
10030	1,003,000	77,673	172.1	520 / 1,847
10035	1,003,500	77,673	172.2	684 / 2,503
10040	1,004,000	77,673	172.4	1,214 / 2,670

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
10045	1,004,500	77,673	172.4	605 / 2,922
10050	1,005,000	77,673	172.5	198 / 2,956
10055	1,005,500	77,673	172.6	229 / 2,937
10060	1,006,000	77,673	172.6	468 / 3,601
10065	1,006,500	77,673	172.7	695 / 3,385
10070	1,007,000	77,673	172.8	955 / 3,387
10075	1,007,500	77,673	172.8	1,204 / 3,599
10080	1,008,000	77,673	172.9	1,700 / 2,000
10085	1,008,500	77,399	172.9	1,200 / 2,300
10090	1,009,000	77,399	173.0	1,000 / 1,500
10095	1,009,500	77,399	173.0	1,300 / 500
10100	1,010,000	77,399	173.0	1,477 / 183
10101	1,010,076	77,399	173.1	1,300 / 200
10101	1,010,116	77,399	174.0	1,300 / 200
10105	1,010,500	77,399	174.2	2,364 / 183
10110	1,010,985	-8,888	151.7	-9,999 / -9,999
10110	1,011,000	77,399	174.4	3,190 / 183
10115	1,011,500	77,399	174.5	3,562 / 196
10120	1,012,000	77,399	174.6	4,139 / 419
10125	1,012,500	77,399	174.7	3,980 / 707
10130	1,013,000	77,399	174.8	3,930 / 1,202
10135	1,013,500	77,399	174.9	3,811 / 1,450
10140	1,014,000	77,399	175.0	4,025 / 1,638
10145	1,014,500	77,399	175.0	2,945 / 1,714
10150	1,015,000	77,399	175.1	3,045 / 2,123
10155	1,015,500	76,880	175.1	183 / 2,222
10160	1,016,000	76,880	175.3	182 / 2,694
10165	1,016,500	76,880	175.5	182 / 2,299
10170	1,017,000	76,880	175.6	182 / 2,323
10175	1,017,500	76,880	175.8	182 / 2,769
10180	1,018,000	76,880	175.9	182 / 2,919
10185	1,018,500	76,880	176.0	182 / 3,464
10190	1,019,000	76,880	176.0	182 / 3,881
10195	1,019,500	76,880	176.2	182 / 4,203
10200	1,020,000	76,880	176.5	1,821 / 5,030
10206	1,020,624	76,846	176.5	182 / 4,573
<b>Cape Fear River Tributary 1</b>				
077	7,709	1,228	172.6 <sup>1</sup>	180 / 180
082	8,223	1,228	172.6 <sup>1</sup>	183 / 116
086	8,609	1,228	172.6 <sup>1</sup>	180 / 104
093	9,257	1,170	172.6 <sup>1</sup>	114 / 171
098	9,777	1,170	172.6 <sup>1</sup>	58 / 113
099	9,924	1,170	172.6 <sup>1</sup>	117 / 20
100	10,008	1,120	172.6 <sup>1</sup>	117 / 20
108	10,756	1,120	172.6 <sup>1</sup>	163 / 16

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
113	11,319	1,120	173.9	91 / 30
121	12,053	1,019	176.3	10 / 128
124	12,422	1,019	177.2	43 / 17
130	12,982	1,019	179.7	16 / 67
136	13,593	948	182.1	72 / 8
140	14,011	948	183.7	9 / 35
147	14,697	948	187.5	109 / 16
151	15,068	873	188.5	7 / 12
157	15,700	840	193.0	31 / 37
160	15,990	840	193.9	19 / 18
166	16,558	840	197.8	73 / 8
168	16,812	840	199.0	50 / 7
175	17,454	784	203.0	7 / 78
180	17,978	784	205.7	5 / 50
182	18,204	784	207.2	10 / 44
183	18,264	784	212.1	10 / 44
187	18,705	640	212.3	35 / 80
<b>Copper Mine Creek</b>				
000	0	2,906	199.1	355 / 235
008	810	1,211	199.3	50 / 89
015	1,478	1,211	201.2	76 / 80
022	2,151	1,211	206.3	112 / 12
027	2,711	1,211	208.8	24 / 102
031	3,073	1,211	210.1	46 / 145
035	3,489	1,211	211.5	29 / 75
039	3,911	1,211	213.8	20 / 98
040	3,973	1,111	215.1	20 / 98
042	4,200	1,111	215.8	24 / 68
045	4,527	1,111	218.0	61 / 63
048	4,822	1,111	219.2	42 / 48
052	5,212	946	221.0	26 / 64
057	5,690	946	222.3	27 / 75
061	6,101	946	223.4	10 / 85
066	6,606	946	226.4	23 / 34
071	7,145	946	230.3	30 / 36
<b>Deep River</b>				
005	5	54,900	176.5	765 / 48
010	964	54,900	176.4	241 / 157
017	1,711	54,900	176.7	449 / 986
022	2,250	54,900	176.7	363 / 938
028	2,791	54,900	176.8	157 / 157
038	3,750	54,900	177.0	157 / 157
046	4,621	54,900	177.3	293 / 440
055	5,491	54,900	177.5	234 / 157
063	6,317	54,900	177.7	322 / 184
068	6,780	54,900	177.8	157 / 157

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
077	7,737	54,900	178.1	358 / 249
084	8,435	54,900	178.2	271 / 157
091	9,125	54,900	178.4	358 / 187
102	10,209	54,900	178.6	157 / 157
114	11,403	54,900	178.9	170 / 157
117	11,676	54,900	178.5	1,600 / 725
117	11,721	54,900	181.6	1,600 / 725
127	12,682	54,900	182.2	278 / 275
133	13,251	54,900	182.3	304 / 196
142	14,222	54,900	182.6	340 / 342
143	14,278	54,900	182.8	340 / 342
150	15,000	54,900	183.0	173 / 194
154	15,360	54,900	183.1	300 / 320
155	15,492	54,900	183.5	300 / 320
160	16,038	54,900	183.6	288 / 186
169	16,941	54,900	183.8	241 / 259
171	17,055	54,900	185.6	400 / 260
178	17,798	54,900	185.6	157 / 157
197	19,710	54,900	187.8	338 / 157
208	20,774	54,900	189.5	157 / 157
220	21,962	54,900	191.8	157 / 157
226	22,584	54,900	193.7	157 / 157
232	23,250	54,900	194.9	157 / 157
237	23,665	54,600	196.4	156 / 156
242	24,234	54,600	197.6	156 / 156
249	24,948	54,600	198.7	156 / 156
255	25,500	54,600	199.7	220 / 156
262	26,159	54,600	200.4	156 / 156
270	27,000	54,600	201.3	156 / 156
278	27,750	54,600	202.0	156 / 156
286	28,599	54,600	203.1	156 / 331
294	29,374	54,600	203.7	156 / 173
300	30,000	54,600	204.1	156 / 156
308	30,750	54,500	204.9	155 / 155
315	31,463	54,500	205.6	155 / 155
322	32,224	54,500	206.4	245 / 155
328	32,783	54,500	206.8	209 / 300
337	33,679	54,500	207.3	155 / 155
344	34,433	54,500	207.9	264 / 203
351	35,102	54,500	208.5	155 / 155
359	35,928	54,500	209.2	155 / 155
367	36,718	54,500	210.3	133 / 133
374	37,428	53,200	212.1	366 / 203
382	38,178	53,200	213.0	490 / 155
391	39,092	53,200	213.8	522 / 133

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
397	39,678	53,200	214.3	506 / 133
404	40,428	53,200	214.9	597 / 133
412	41,178	53,200	215.4	688 / 138
420	42,042	53,200	215.9	435 / 269
428	42,806	53,200	216.3	300 / 254
434	43,428	53,200	216.6	209 / 172
442	44,163	53,200	217.2	243 / 133
449	44,892	53,200	217.6	215 / 183
457	45,741	53,200	218.2	133 / 394
464	46,363	53,200	218.5	133 / 419
471	47,105	53,200	218.8	133 / 322
476	47,640	53,200	219.1	201 / 212
484	48,397	53,200	219.5	219 / 148
493	49,267	53,200	219.9	236 / 133
501	50,058	53,200	220.3	205 / 133
510	50,958	53,200	220.9	260 / 213
515	51,472	53,200	221.1	280 / 192
521	52,128	53,200	221.4	332 / 133
537	53,676	53,200	222.0	488 / 133
548	54,774	53,200	222.4	224 / 414
554	55,361	53,100	222.6	204 / 476
557	55,715	53,100	222.7	132 / 416
558	55,767	53,100	223.0	132 / 416
562	56,157	53,100	223.2	191 / 418
569	56,920	53,100	223.5	132 / 403
574	57,420	53,100	223.7	132 / 418
581	58,118	53,100	223.9	355 / 131
593	59,299	53,100	224.3	388 / 357
601	60,068	53,100	224.5	380 / 271
608	60,752	53,100	224.7	475 / 152
612	61,190	53,100	224.8	475 / 131
628	62,805	53,100	225.2	500 / 135
640	63,968	52,900	225.5	269 / 130
645	64,491	52,900	225.7	292 / 130
652	65,170	52,900	226.1	321 / 596
659	65,920	52,900	226.3	137 / 918
667	66,670	52,900	226.4	141 / 956
682	68,170	52,900	226.6	386 / 529
689	68,920	52,900	226.8	473 / 391
697	69,747	52,900	226.9	434 / 218
704	70,420	52,900	227.0	350 / 130
711	71,136	52,900	227.2	318 / 130
717	71,737	52,900	227.4	416 / 130
725	72,499	52,900	227.6	774 / 130
741	74,080	52,900	227.8	128 / 128

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
749	74,920	52,700	228.1	199 / 386
757	75,687	52,700	228.2	128 / 324
764	76,420	52,700	228.4	178 / 600
778	77,827	52,700	228.8	162 / 128
787	78,670	52,700	229.0	171 / 130
794	79,408	52,700	229.2	128 / 128
801	80,149	52,700	229.4	128 / 128
809	80,917	52,700	229.6	128 / 360
817	81,667	52,700	229.8	341 / 200
824	82,356	52,700	230.0	410 / 353
832	83,167	52,700	230.0	128 / 128
839	83,917	52,700	230.2	128 / 128
848	84,759	52,700	230.4	154 / 128
854	85,417	52,700	230.6	128 / 142
862	86,167	52,700	230.7	128 / 128
863	86,314	52,700	230.4	170 / 175
864	86,366	52,700	231.0	170 / 175
864	86,445	52,700	231.6	128 / 128
865	86,515	52,700	231.6	192 / 203
865	86,549	52,700	231.6	192 / 203
869	86,918	52,700	232.2	128 / 490
875	87,547	52,700	232.3	128 / 340
882	88,203	52,700	232.5	640 / 247
892	89,242	52,700	232.9	500 / 200
901	90,144	52,600	232.7	500 / 200
909	90,908	52,600	232.8	200 / 200
916	91,612	52,600	232.9	177 / 171
917	91,657	52,600	232.8	177 / 171
922	92,160	52,600	234.9	571 / 127
930	92,964	52,600	235.0	694 / 127
936	93,567	52,600	235.1	883 / 127
944	94,368	52,600	235.2	1,042 / 145
950	94,952	52,600	235.3	829 / 227
959	95,882	52,600	235.4	460 / 352
966	96,592	52,600	235.4	226 / 333
973	97,299	52,600	235.6	278 / 246
974	97,421	52,600	235.6	254 / 254
976	97,559	52,600	235.8	254 / 254
978	97,836	52,600	236.2	286 / 382
989	98,937	52,600	236.4	243 / 291
995	99,458	52,500	236.4	347 / 146
1003	100,266	52,500	236.5	289 / 126
1011	101,082	52,500	236.6	300 / 126
1018	101,824	52,500	236.7	276 / 126
1024	102,358	52,500	236.8	299 / 126

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
1034	103,378	52,500	237.0	270 / 126
1041	104,066	52,500	237.1	356 / 126
1045	104,532	52,500	237.1	380 / 126
1056	105,585	52,500	237.3	380 / 128
1063	106,310	52,500	237.4	606 / 126
1072	107,246	52,500	237.6	315 / 477
1081	108,141	52,500	237.6	424 / 286
1092	109,248	52,000	237.8	406 / 668
1098	109,845	52,000	237.9	429 / 456
1104	110,366	52,000	238.0	586 / 402
1113	111,326	52,000	238.1	998 / 122
1122	112,229	52,000	238.2	1,177 / 169
1131	113,148	52,000	238.3	1,147 / 123
1138	113,783	52,000	238.4	815 / 342
1148	114,801	52,000	238.5	122 / 1,114
1157	115,735	52,000	238.7	122 / 1,959
1168	116,777	52,000	238.8	122 / 3,286
1182	118,209	52,000	238.9	122 / 3,142
1192	119,166	52,000	238.9	122 / 3,015
1197	119,653	52,000	239.0	238 / 1,700
1197	119,701	52,000	239.1	238 / 1,700
1211	121,108	52,000	239.2	536 / 2,264
1234	123,358	52,000	239.4	197 / 759
1241	124,108	52,000	239.4	197 / 570
1249	124,858	52,000	239.5	196 / 871
1258	125,829	52,000	239.6	926 / 366
1265	126,456	52,000	239.6	1,148 / 256
1271	127,108	52,000	239.7	882 / 548
1279	127,858	52,000	239.8	769 / 512
1286	128,608	52,000	239.8	891 / 367
1295	129,515	52,000	239.9	954 / 335
1301	130,108	52,000	239.9	837 / 196
1316	131,608	52,000	240.0	450 / 290
1324	132,428	51,900	240.1	350 / 600
1326	132,571	51,900	240.1	350 / 600
1337	133,741	51,600	241.0	616 / 652
1348	134,754	51,600	241.2	914 / 73
1356	135,582	51,600	241.7	728 / 107
1364	136,396	51,600	242.4	523 / 114
1371	137,093	51,600	242.8	367 / 73
1378	137,803	51,600	243.2	400 / 112
1386	138,608	51,600	243.8	523 / 80
1394	139,416	51,500	244.5	676 / 78
1401	140,114	51,500	244.7	548 / 141
1412	141,159	51,500	245.4	539 / 154

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
1421	142,080	51,500	245.9	621 / 118
1428	142,849	51,500	246.3	685 / 102
1435	143,504	51,500	246.9	749 / 145
1447	144,727	51,500	247.6	445 / 250
1460	145,997	51,500	248.2	308 / 774
1465	146,528	51,500	248.4	157 / 835
1478	147,830	51,500	249.0	696 / 608
1493	149,265	51,500	249.4	1,302 / 48
1500	150,039	51,500	249.4	1,389 / 134
1533	153,297	51,400	250.2	1,317 / 969
1546	154,583	51,400	250.2	81 / 863
1560	155,988	51,400	250.7	414 / 234
1573	157,290	51,400	251.9	736 / 565
<b>Deep River Tributary 1</b>				
002	183	1,333	226.5 <sup>1</sup>	16 / 14
004	395	1,333	226.5 <sup>1</sup>	57 / 43
004	418	1,333	226.5 <sup>1</sup>	490 / 51
005	458	1,333	226.5 <sup>1</sup>	490 / 51
020	2,003	1,333	226.5 <sup>1</sup>	45 / 484
035	3,462	1,125	226.5 <sup>1</sup>	251 / 109
042	4,180	1,125	226.5 <sup>1</sup>	227 / 13
050	4,957	1,125	226.5 <sup>1</sup>	366 / 13
058	5,790	1,125	226.5 <sup>1</sup>	219 / 208
064	6,441	1,125	226.5 <sup>1</sup>	13 / 231
071	7,142	807	226.5 <sup>1</sup>	28 / 91
076	7,625	807	226.5 <sup>1</sup>	13 / 177
088	8,763	807	226.5 <sup>1</sup>	34 / 13
099	9,873	751	226.5 <sup>1</sup>	73 / 68
108	10,755	751	226.5 <sup>1</sup>	19 / 74
114	11,399	751	227.2	13 / 86
120	11,964	751	228.3	52 / 13
127	12,737	751	231.4	14 / 45
133	13,341	751	234.2	13 / 42
140	14,008	751	236.5	20 / 13
<b>Deep River Tributary 2</b>				
001	114	509	226.5 <sup>1</sup>	11 / 149
006	619	509	226.5 <sup>1</sup>	16 / 91
011	1,133	509	226.5 <sup>1</sup>	11 / 137
020	2,000	509	226.5 <sup>1</sup>	104 / 11
027	2,701	509	226.5 <sup>1</sup>	56 / 11
031	3,083	509	226.5 <sup>1</sup>	24 / 26
034	3,374	509	227.9	13 / 28
038	3,847	509	233.0	11 / 67
040	4,006	509	235.1	11 / 11
<b>Deep River Tributary 3</b>				
003	328	524	226.5 <sup>1</sup>	41 / 12

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
008	762	524	226.5 <sup>1</sup>	48 / 11
012	1,224	524	226.5 <sup>1</sup>	34 / 48
019	1,882	524	226.5 <sup>1</sup>	41 / 48
024	2,370	524	226.6	11 / 75
025	2,459	524	242.8	-9,999 / -9,999
025	2,517	524	242.8	69 / 112
029	2,939	524	242.8	150 / 190
036	3,566	524	242.8	40 / 29
041	4,094	524	243.2	58 / 55
045	4,524	524	243.6	45 / 35
051	5,098	524	246.5	23 / 31
<b>Deep River Tributary 9</b>				
005	537	659	251.9 <sup>1</sup>	95 / 53
013	1,310	659	251.9 <sup>1</sup>	45 / 32
017	1,655	659	251.9 <sup>1</sup>	30 / 44
020	1,962	659	251.9 <sup>1</sup>	58 / 18
030	3,038	659	251.9 <sup>1</sup>	43 / 23
035	3,491	659	251.9 <sup>1</sup>	18 / 47
049	4,874	659	255.7	18 / 40
<b>Fall Creek</b>				
007	742	2,883	156.0 <sup>1</sup>	50 / 50
010	1,023	2,883	156.4	104 / 63
015	1,496	2,883	157.7	176 / 122
020	1,991	2,883	158.3	300 / 22
022	2,229	2,883	158.7	393 / 14
031	3,068	2,862	160.8	127 / 127
035	3,510	2,862	164.2	100 / 20
040	3,993	2,862	166.9	120 / 20
045	4,491	2,862	169.3	142 / 14
050	5,040	2,862	171.6	93 / 14
054	5,426	2,790	174.3	67 / 14
060	6,029	2,790	177.6	29 / 73
065	6,480	2,790	179.9	87 / 78
070	6,953	2,790	182.6	174 / 14
075	7,495	2,790	185.6	126 / 96
079	7,886	2,790	187.1	146 / 14
085	8,479	2,698	191.1	171 / 82
087	8,670	2,698	192.2	75 / 50
087	8,750	2,698	197.3	75 / 50
093	9,340	2,698	197.9	114 / 18
100	9,990	2,698	201.2	40 / 14
105	10,550	2,561	205.4	118 / 13
110	10,996	2,561	207.1	119 / 28
<b>Gum Fork Creek</b>				
003	299	2,383	199.1 <sup>1</sup>	50 / 180
005	544	2,383	199.1 <sup>1</sup>	58 / 96

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
010	1,011	2,383	200.7	50 / 105
016	1,623	2,383	202.2	13 / 157
021	2,104	2,383	203.2	22 / 23
021	2,145	2,383	204.6	22 / 23
027	2,679	2,283	205.8	248 / 51
033	3,349	2,283	206.0	211 / 172
039	3,895	2,221	206.3	251 / 23
044	4,364	2,221	206.8	202 / 12
056	5,562	2,061	210.2	222 / 12
193	19,264	702	249.9	62 / 11
196	19,581	702	250.8	45 / 35
196	19,626	702	252.2	45 / 35
198	19,815	702	252.7	49 / 11
202	20,225	702	256.2	48 / 9
208	20,832	702	262.2	44 / 9
215	21,462	702	269.1	37 / 11
<b>Hughes Creek</b>				
119	11,892	3,433	178.9	411 / 216
127	12,728	3,433	179.4	383 / 243
132	13,155	3,433	179.8	327 / 169
138	13,828	3,433	180.4	333 / 113
146	14,624	3,433	181.3	400 / 400
151	15,060	3,433	181.8	188 / 17
151	15,116	3,268	182.4	188 / 17
158	15,791	3,268	183.8	177 / 284
164	16,441	3,268	184.3	269 / 65
171	17,127	3,268	185.2	325 / 25
179	17,943	3,268	186.1	292 / 262
184	18,430	3,268	186.6	180 / 285
192	19,156	3,268	187.6	269 / 16
200	20,010	3,101	189.2	57 / 337
207	20,745	3,101	190.0	191 / 299
211	21,087	3,101	190.2	333 / 187
214	21,405	3,101	190.6	328 / 159
220	22,005	3,101	192.3	168 / 38
225	22,522	3,101	193.7	269 / 227
232	23,154	3,101	194.3	254 / 260
237	23,734	3,101	194.7	312 / 216
239	23,928	3,101	194.8	233 / 112
240	23,990	2,906	194.8	233 / 112
247	24,740	2,906	195.9	305 / 74
252	25,220	2,906	196.8	26 / 27
253	25,275	2,906	198.8	26 / 27
254	25,375	2,906	199.1	355 / 235
<b>Hughes Creek Tributary 1</b>				
007	686	461	172.9 <sup>1</sup>	25 / 25

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
011	1,113	461	172.9 <sup>1</sup>	35 / 83
012	1,168	461	172.9 <sup>1</sup>	35 / 83
012	1,181	461	172.9 <sup>1</sup>	70 / 590
013	1,287	461	172.9 <sup>1</sup>	64 / 50
013	1,332	461	172.9 <sup>1</sup>	64 / 50
015	1,501	461	172.9 <sup>1</sup>	30 / 12
017	1,724	461	172.9 <sup>1</sup>	8 / 38
018	1,780	461	173.0	8 / 38
020	1,973	461	174.5	40 / 16
024	2,431	461	177.3	18 / 8
027	2,685	461	179.9	9 / 20
033	3,334	365	183.7	13 / 7
040	3,965	365	188.7	9 / 9
045	4,467	365	194.0	14 / 12
<b>Lick Creek</b>				
063	6,332	8,182	172.9 <sup>1</sup>	1,005 / 55
071	7,060	8,182	172.9 <sup>1</sup>	1,320 / 55
071	7,108	8,182	172.9 <sup>1</sup>	1,320 / 55
087	8,738	8,182	172.9 <sup>1</sup>	778 / 189
111	11,137	8,028	172.9 <sup>1</sup>	843 / 111
131	13,088	5,764	172.9 <sup>1</sup>	769 / 25
143	14,323	5,764	172.9 <sup>1</sup>	786 / 25
<b>Lick Creek Tributary 1</b>				
025	2,524	391	172.9 <sup>1</sup>	10 / 149
030	3,003	391	172.9 <sup>1</sup>	32 / 34
031	3,053	344	172.9 <sup>1</sup>	32 / 34
035	3,454	344	177.8	9 / 19
036	3,622	344	180.3	35 / 13
037	3,678	344	181.6	35 / 13
040	3,964	344	183.1	5 / 5
044	4,361	314	188.0	8 / 8
049	4,933	314	195.5	8 / 9
054	5,434	314	200.9	9 / 8
059	5,864	314	206.6	8 / 4
063	6,343	314	216.4	20 / 14
068	6,850	314	225.0	8 / 9
<b>Little Pocket Creek</b>				
004	388	3,386	237.6 <sup>1</sup>	50 / 20
008	807	3,386	237.6 <sup>1</sup>	32 / 105
009	871	3,386	237.6 <sup>1</sup>	32 / 105
016	1,615	3,386	237.6 <sup>1</sup>	110 / 137
022	2,177	3,386	237.6 <sup>1</sup>	31 / 29
025	2,545	3,386	237.6 <sup>1</sup>	26 / 26
031	3,071	3,386	237.6 <sup>1</sup>	24 / 141
038	3,826	3,386	237.6 <sup>1</sup>	245 / 21
041	4,146	3,386	237.6 <sup>1</sup>	136 / 24

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
045	4,450	3,386	237.6 <sup>1</sup>	168 / 23
046	4,589	3,386	237.6 <sup>1</sup>	149 / 21
048	4,752	3,386	237.6 <sup>1</sup>	95 / 21
053	5,255	3,386	237.6 <sup>1</sup>	294 / 21
057	5,681	3,386	237.6 <sup>1</sup>	116 / 28
065	6,486	3,386	237.6 <sup>1</sup>	31 / 30
067	6,698	3,386	237.6 <sup>1</sup>	57 / 45
071	7,051	3,386	237.6 <sup>1</sup>	27 / 27
075	7,537	3,386	237.6 <sup>1</sup>	50 / 21
079	7,936	3,386	237.6 <sup>1</sup>	21 / 21
083	8,306	3,386	237.6 <sup>1</sup>	32 / 32
087	8,707	3,386	237.6 <sup>1</sup>	31 / 39
091	9,084	3,209	237.6 <sup>1</sup>	20 / 20
095	9,505	3,209	237.6 <sup>1</sup>	20 / 20
098	9,842	3,209	237.6 <sup>1</sup>	34 / 43
<b>Little Shaddox Creek</b>				
038	3,794	1,098	175.1 <sup>2</sup>	72 / 81
048	4,846	1,098	166.3	280 / 40
054	5,447	1,098	175.3 <sup>2</sup>	142 / 104
063	6,328	1,025	175.3 <sup>2</sup>	198 / 68
068	6,762	1,025	175.4 <sup>2</sup>	152 / 130
073	7,298	1,025	175.4 <sup>2</sup>	271 / 68
085	8,456	937	175.5 <sup>1</sup>	128 / 164
097	9,655	877	175.5 <sup>1</sup>	94 / 87
104	10,424	851	176.9	16 / 124
110	11,001	851	177.7	245 / 62
117	11,656	740	178.4	216 / 106
121	12,058	740	179.2	36 / 134
124	12,440	740	180.2	11 / 296
130	12,956	740	180.7	18 / 598
131	13,106	639	180.8	18 / 598
134	13,450	639	181.6	8 / 156
139	13,910	477	183.8	189 / 46
144	14,396	477	184.8	91 / 29
146	14,628	477	185.5	90 / 100
147	14,688	436	185.4	90 / 100
150	14,992	436	187.0	9 / 64
156	15,650	336	190.3	50 / 50
162	16,182	336	192.3	62 / 47
163	16,299	336	192.8	15 / 14
164	16,371	336	194.9	15 / 14
168	16,781	336	196.1	8 / 53
<b>Lonnie Wombles Creek</b>				
090	9,049	2,349	176.5 <sup>2</sup>	35 / 186
099	9,907	2,349	176.5 <sup>2</sup>	197 / 299
108	10,799	2,349	176.5 <sup>1</sup>	35 / 285

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
125	12,503	2,258	176.5 <sup>1</sup>	197 / 158
135	13,480	2,258	176.5 <sup>1</sup>	137 / 170
141	14,133	2,258	176.5 <sup>1</sup>	225 / 265
150	15,009	2,043	176.5 <sup>1</sup>	373 / 103
157	15,672	2,043	176.5 <sup>1</sup>	475 / 27
162	16,223	2,043	176.5 <sup>1</sup>	409 / 28
164	16,445	2,043	176.5 <sup>1</sup>	38 / 38
165	16,491	2,043	176.5 <sup>1</sup>	38 / 38
173	17,348	2,024	177.7	244 / 340
177	17,695	2,024	178.0	163 / 213
185	18,473	2,024	179.7	100 / 166
193	19,314	1,835	181.4	91 / 197
198	19,802	835	181.9	149 / 202
207	20,715	835	182.7	20 / 87
214	21,419	835	186.5	52 / 82
218	21,818	835	188.5	290 / 74
219	21,894	813	189.9	290 / 74
222	22,234	813	190.1	127 / 68
228	22,761	813	191.4	124 / 18
235	23,487	754	194.7	73 / 18
239	23,891	754	196.6	73 / 17
245	24,482	754	198.1	208 / 18
249	24,926	754	200.3	18 / 97
251	25,141	754	202.1	28 / 27
252	25,191	754	204.5	28 / 27
258	25,823	616	206.3	41 / 16
263	26,315	616	210.3	95 / 74
267	26,696	616	212.5	26 / 72
273	27,349	580	217.4	69 / 15
278	27,776	580	220.2	52 / 14
284	28,379	580	224.4	70 / 35
286	28,647	537	226.5	18 / 23
292	29,168	537	231.2	14 / 14
298	29,751	537	237.4	14 / 23
300	29,958	537	244.4	60 / 20
304	30,403	465	272.4	100 / 100
305	30,458	465	272.4	100 / 100
305	30,510	465	272.4	100 / 100
306	30,636	465	272.4	122 / 80
309	30,924	465	272.4	91 / 111
311	31,093	465	272.4	100 / 71
313	31,269	465	272.4	100 / 34
315	31,537	465	272.4	87 / 101
321	32,086	129	272.3	30 / 30
322	32,221	129	277.0	50 / 8

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
324	32,362	129	282.4	27 / 11
325	32,549	129	287.9	5 / 3
327	32,664	129	300.6	14 / 40
328	32,762	129	300.5	4 / 30
329	32,875	129	300.7	15 / 15
329	32,931	129	310.6	35 / 30
330	33,028	129	310.6	20 / 40
331	33,053	129	310.6	15 / 6
332	33,162	129	324.4	49 / 105
333	33,257	129	324.4	35 / 75
334	33,369	129	324.4	35 / 75
335	33,487	129	324.4	35 / 75
337	33,679	129	328.6	13 / 15
<b>Lonnie Wombles Tributary 1</b>				
005	480	1,487	181.6 <sup>1</sup>	100 / 66
010	984	1,487	182.0	98 / 57
017	1,678	1,487	183.6	90 / 97
023	2,277	1,487	185.1	112 / 155
029	2,853	1,487	187.1	82 / 37
034	3,419	1,418	188.1	88 / 393
038	3,826	1,418	188.4	17 / 248
039	3,910	1,418	192.8	17 / 248
045	4,466	1,418	192.9	46 / 191
048	4,844	1,418	193.2	107 / 115
058	5,754	1,418	194.0	143 / 221
069	6,885	1,418	195.1	216 / 149
080	8,034	1,293	198.0	48 / 174
099	9,857	1,293	201.8	37 / 94
105	10,466	1,210	203.2	146 / 128
107	10,714	1,210	203.7	25 / 25
108	10,764	1,210	205.1	25 / 25
112	11,207	887	206.3	79 / 43
120	11,961	887	208.4	53 / 47
126	12,629	887	211.3	34 / 108
133	13,282	867	214.5	126 / 9
137	13,677	867	217.5	95 / 9
142	14,225	867	221.0	104 / 46
145	14,451	795	222.0	86 / 44
149	14,879	795	225.0	63 / 55
153	15,301	795	227.7	65 / 73
156	15,648	795	229.2	59 / 68
160	15,959	734	230.1	71 / 58
168	16,780	734	234.2	47 / 32
171	17,067	683	237.8	89 / 28
174	17,422	683	240.2	52 / 50

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
181	18,100	683	245.6	9 / 66
182	18,220	683	246.2	12 / 12
186	18,560	616	253.7	12 / 12
191	19,091	616	255.0	23 / 32
194	19,450	616	258.2	43 / 42
197	19,673	570	259.6	48 / 40
200	20,008	570	262.6	74 / 8
204	20,376	570	266.5	69 / 8
207	20,726	466	269.5	37 / 22
211	21,053	466	273.4	16 / 9
214	21,392	187	279.3	34 / 8
217	21,726	187	286.9	5 / 3
221	22,057	187	295.8	8 / 7
225	22,500	187	307.8	8 / 7
228	22,844	187	315.6	8 / 8
231	23,144	187	323.7	7 / 8
<b>Lonnie Wombles Tributary 2</b>				
003	310	630	181.6 <sup>1</sup>	90 / 10
006	578	630	207.9	80 / 10
010	1,003	630	210.6	92 / 75
015	1,547	630	214.3	92 / 8
021	2,108	601	218.5	24 / 64
026	2,598	601	222.0	54 / 19
033	3,272	513	227.6	53 / 9
037	3,693	513	231.1	58 / 18
041	4,145	513	235.5	60 / 7
045	4,459	513	238.3	29 / 23
047	4,729	513	241.4	15 / 15
050	5,009	416	266.0	15 / 15
053	5,316	416	266.0	100 / 76
056	5,637	416	266.0	100 / 81
<b>Patterson Creek</b>				
057	5,723	2,408	236.3 <sup>1</sup>	26 / 31
061	6,100	2,408	236.3 <sup>1</sup>	23 / 49
069	6,913	2,408	236.3 <sup>1</sup>	18 / 40
075	7,487	2,408	236.3	18 / 29
083	8,337	2,408	238.6	90 / 69
093	9,313	2,408	240.3	18 / 50
099	9,929	2,408	242.6	55 / 61
107	10,709	2,408	243.8	46 / 32
114	11,396	2,408	245.6	18 / 41
123	12,262	2,408	248.3	18 / 82
129	12,933	2,408	250.2	28 / 105
135	13,457	2,408	251.1	18 / 61
140	14,019	2,408	252.2	54 / 38
149	14,892	2,229	253.6	72 / 66

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
157	15,720	2,229	254.7	43 / 54
162	16,236	2,229	255.8	101 / 66
173	17,349	2,229	256.7	58 / 71
185	18,532	2,229	258.0	97 / 126
194	19,415	2,229	258.7	89 / 29
202	20,207	1,980	259.6	102 / 82
213	21,274	1,980	260.6	90 / 64
221	22,101	1,980	262.1	100 / 93
230	22,977	1,980	264.6	118 / 75
236	23,596	1,734	267.2	52 / 77
246	24,644	1,734	271.7	33 / 65
<b>Pocket Creek</b>				
008	768	7,192	237.6 <sup>1</sup>	35 / 35
013	1,306	7,192	237.6 <sup>1</sup>	35 / 62
017	1,670	7,192	237.6 <sup>1</sup>	35 / 50
022	2,227	7,192	237.6 <sup>1</sup>	37 / 35
025	2,507	7,192	237.6 <sup>1</sup>	35 / 43
034	3,357	7,078	237.6 <sup>1</sup>	34 / 63
037	3,711	7,078	237.6 <sup>1</sup>	34 / 56
047	4,697	7,078	237.6 <sup>1</sup>	103 / 52
053	5,301	7,078	237.6 <sup>1</sup>	86 / 74
058	5,819	7,078	237.6 <sup>1</sup>	209 / 111
063	6,332	7,078	237.6 <sup>1</sup>	562 / 127
074	7,354	5,579	237.6 <sup>1</sup>	122 / 620
083	8,305	5,579	237.6 <sup>1</sup>	80 / 34
087	8,709	5,579	237.6 <sup>1</sup>	96 / 41
091	9,131	5,579	237.6 <sup>1</sup>	61 / 50
096	9,599	5,579	237.6 <sup>1</sup>	29 / 85
102	10,214	5,579	237.6 <sup>1</sup>	61 / 43
108	10,762	5,579	237.6 <sup>1</sup>	89 / 52
112	11,205	5,579	237.6 <sup>1</sup>	85 / 68
115	11,545	5,579	237.6 <sup>1</sup>	62 / 61
118	11,831	5,579	237.6 <sup>1</sup>	32 / 49
125	12,540	5,579	237.6 <sup>1</sup>	52 / 121
130	12,964	5,579	237.6 <sup>1</sup>	149 / 50
135	13,521	5,579	237.9	68 / 62
138	13,826	5,579	238.4	97 / 37
141	14,063	5,579	238.8	71 / 53
145	14,492	5,579	239.7	29 / 187
149	14,890	5,579	239.9	41 / 61
153	15,311	5,579	240.7	69 / 60
157	15,668	5,579	241.0	33 / 29
160	15,967	5,579	242.5	85 / 29
164	16,383	5,579	243.3	74 / 45
169	16,859	5,579	243.9	33 / 37

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
173	17,335	5,474	245.4	52 / 65
183	18,254	5,474	246.8	82 / 120
187	18,738	5,474	247.2	203 / 38
190	19,038	5,474	247.5	117 / 119
<b>Purgatory Branch</b>				
002	211	942	235.4 <sup>3</sup>	19 / 20
007	728	942	236.0 <sup>1</sup>	15 / 15
015	1,532	942	236.0 <sup>1</sup>	13 / 13
020	1,974	942	236.0 <sup>1</sup>	18 / 17
023	2,290	942	238.4	18 / 17
025	2,489	942	239.0	17 / 27
029	2,933	942	244.9	13 / 7
035	3,455	942	246.8	27 / 46
048	4,750	942	248.1	14 / 14
050	5,002	942	252.2	14 / 14
<b>Rocky Branch (into Deep River)</b>				
005	509	2,036	204.2 <sup>1</sup>	47 / 51
012	1,199	2,036	205.1	18 / 48
015	1,460	2,036	207.4	26 / 15
020	2,023	2,036	214.1	24 / 35
027	2,702	2,036	222.4	79 / 12
<b>Smith Creek</b>				
002	160	1,670	244.3 <sup>1</sup>	-9,999 / -9,999
004	422	1,670	244.3 <sup>1</sup>	-9,999 / -9,999
007	701	1,670	244.3 <sup>1</sup>	15 / 15
012	1,193	1,670	244.3 <sup>1</sup>	68 / 15
022	2,198	1,670	244.3 <sup>1</sup>	51 / 387
025	2,532	1,670	244.3 <sup>1</sup>	138 / 95
030	2,989	1,670	244.3 <sup>1</sup>	22 / 213
034	3,419	1,670	244.3 <sup>1</sup>	63 / 39
037	3,696	1,670	244.3 <sup>1</sup>	41 / 36
042	4,219	1,670	244.3 <sup>1</sup>	51 / 145
047	4,667	1,670	244.3 <sup>1</sup>	159 / 15
055	5,480	1,455	244.3 <sup>1</sup>	14 / 40
059	5,918	1,455	244.3 <sup>1</sup>	84 / 14
065	6,547	1,455	244.3 <sup>1</sup>	209 / 14
076	7,560	1,455	244.3 <sup>1</sup>	115 / 7
081	8,058	1,455	244.3 <sup>1</sup>	140 / 14
092	9,170	1,455	244.3 <sup>1</sup>	86 / 14
097	9,703	1,455	244.3 <sup>1</sup>	118 / 40
101	10,094	1,455	244.3 <sup>1</sup>	78 / 14
107	10,747	1,455	244.3 <sup>1</sup>	178 / 14
111	11,127	1,455	244.3 <sup>1</sup>	96 / 14
119	11,918	1,455	244.9	119 / 26
121	12,120	1,455	245.2	46 / 26
125	12,481	1,455	246.3	39 / 17

**Table 17 - Limited Detailed Flood Hazard Data**

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
129	12,940	1,455	247.6	57 / 51
133	13,342	1,151	248.3	59 / 93
134	13,367	1,151	248.2	20 / 147
134	13,447	1,151	258.2	20 / 147
139	13,917	1,151	258.3	59 / 152
145	14,545	1,151	258.3	252 / 80
149	14,934	1,151	258.3	68 / 127
153	15,291	1,151	258.4	85 / 68
159	15,949	1,151	258.5	66 / 55
167	16,706	1,151	258.8	122 / 97

<sup>1</sup>Elevation includes backwater effects

<sup>2</sup>Flooding controlled by Cape Fear River

<sup>3</sup>Flooding controlled by Big Buffalo Creek

## 5.3 Coastal Analyses

This section is not applicable to this FIS project. Table 18 "Summary of Coastal Stillwater Elevations" and Table 19 "Summary of Coastal Analyses" do not apply to Lee County.

# 6.0 Mapping Methods

## 6.1 Vertical and Horizontal Control

### Vertical Datum

All FISs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. With the finalization of the North American Vertical Datum of 1988 (NAVD 88), all North Carolina FISs have been prepared using NAVD 88 as the referenced vertical datum.

All flood elevations shown on the FIRM for Lee County are referenced to NAVD 88. Structure and ground elevations in the county must, therefore, be referenced to NAVD 88. It is important to note that FISs for adjacent communities in neighboring states may be referenced to NGVD 29. This may result in BFE differences across political boundaries between the communities.

As noted above, the elevations shown in this FIS are referenced to NAVD 88. Ground, structure, and flood elevations may be compared and/or referenced to NGVD 29 by applying a standard conversion factor. The conversion factor for Lee County is # feet. The locations used to establish the conversion factor were USGS quadrangle corners that fell within the county, as well as those that were within 2.5 miles outside the county. The benchmarks are referenced to NAVD 88. Table 20, "Datum Conversion Locations and Values," is shown below.

Table 20, "Datum Conversion Locations and Values."

**Table 20 - Datum Conversion Locations and Values**

Latitude	Longitude	Conversion from NGVD29 to NAVD88 (feet)
35.50	-79.25	-0.76
35.50	-79.00	-0.75
35.37	-79.13	-0.77
35.50	-79.12	-0.75
35.38	-79.25	-0.77
Average conversion in Lee County from NGVD 29 to NAVD 88 = -0.76 feet		

The vertical datum conversion factor for all flooding sources which run along a county boundary are in accordance with the conversion factor used in those contiguous counties.

BFEs shown on the FIRM represent whole-foot rounded values. For example, a 1% annual chance water-surface elevation of 102.4 feet will appear as 102 on the FIRM and 102.6 feet will appear as 103. Therefore, users who wish to convert the elevations in this FIS to NGVD 29 should apply the stated conversion factor(s) to elevations shown on the Flood Profiles and/or Water-surface elevation rasters and supporting data tables in the FIS Report, which are shown, at a minimum, to the nearest 0.1 foot.

For more information on NAVD 88, see Converting the National Flood Insurance Program to the North American Vertical Datum of 1988, or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, Rockville, Maryland 20910 (<http://www.ngs.noaa.gov>).

### **Vertical Control Monuments**

Qualifying bench marks within Lee County that are cataloged by the National Geodetic Survey (NGS) and entered into the National Spatial Reference System (NSRS) as First or Second Order Vertical, with a vertical stability classification of A, B, or C, are shown and labeled on the FIRM with their 6-character NSRS Permanent Identifier (PID).

The National Geodetic Survey establishes precisely located monuments on the North Carolina Grid System and Bench Marks referenced to a vertical datum (NGVD 1929 and NAVD 1988).

Bench marks cataloged by the NGS and entered into the NSRS vary widely in vertical stability classification. NSRS vertical stability classifications are as follows:

- Stability A: Monuments of the most reliable nature, expected to hold position/elevation well (e.g., mounted in bedrock)
- Stability B: Monuments which generally hold their position/elevation well (e.g., concrete bridge abutment)
- Stability C: Monuments which may be affected by surface ground movements (e.g., concrete monument below frost line)
- Stability D: Mark of questionable or unknown vertical stability (e.g., concrete monument above frost line, or steel witness post)

Monuments with a Stability D classification may be used as Elevation Reference Marks (ERMs) when a Stability C or better monument is not an option. These ERMs must be approved by NCGS and can be set and used as elevation bench marks to establish vertical control and produce NC DFIRMs. Including such ERMs will greatly augment North Carolina's useable vertical control network.

In addition, when local jurisdictions have established their own vertical monument network, these monuments may also be shown on the FIRM with the appropriate designations. Local monuments will be placed on the FIRM if the community has requested that they be included and if the monuments meet the aforementioned criteria.

North Carolina Geodetic Survey (NCGS) and contractor surveyed vertical control monuments will be shown on the FIRM panels. Those cataloged by NCGS meet similar requirements to the NGS monuments as described above. Most monuments that have been cataloged by NCGS have been established to NGS standards, but have not been submitted to NGS for inclusion into the NSRS. The qualifying criteria for depicting bench marks established by the State's contractors on the new digital FIRM panels include:

- GPS surveying of permanent 3-D survey monuments to 5-centimeter or better local network accuracy guidelines, in accordance with NOAA Technical Memorandum NOS NGS-58 "Guidelines for Establishing GPS-Derived Ellipsoid Heights (Standards: 2 cm and 5 cm)," and conversion to NAVD 88 orthometric heights using NGS' latest geoid mode;
- Requiring a stability classification of "C" or better; and
- Submitting GPS files and station descriptions to NCGS.

To obtain current information for cataloging local bench marks in the NSRS, please visit the Data Sheet page of the NGS website at <http://www.ngs.noaa.gov/cgi-bin/datasheet.prl>, or contact the NGS Information Services Branch at:

**NGS Information Services  
NOAA, N/NGS12  
National Geodetic Survey  
SSMC-3, #9202  
1315 East-West Highway**

Information regarding the NCGS or State contractor bench marks can be obtained through the NCGS website at [www.ncgs.state.nc.us](http://www.ncgs.state.nc.us), or by phone at (919) 733-3836.

It is important to note that temporary vertical monuments, sometimes called Elevation Reference Marks, are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, interested individuals may contact FEMA to access this information.

### **Horizontal Datum and Control**

The digital files that comprise the FIRM are georeferenced to an established coordinate system. The coordinate system used for the production of this FIRM is North Carolina State Plane (FIPZONE 3200) referenced to the North American Datum of 1983 (NAD83), GRS80 ellipsoid.

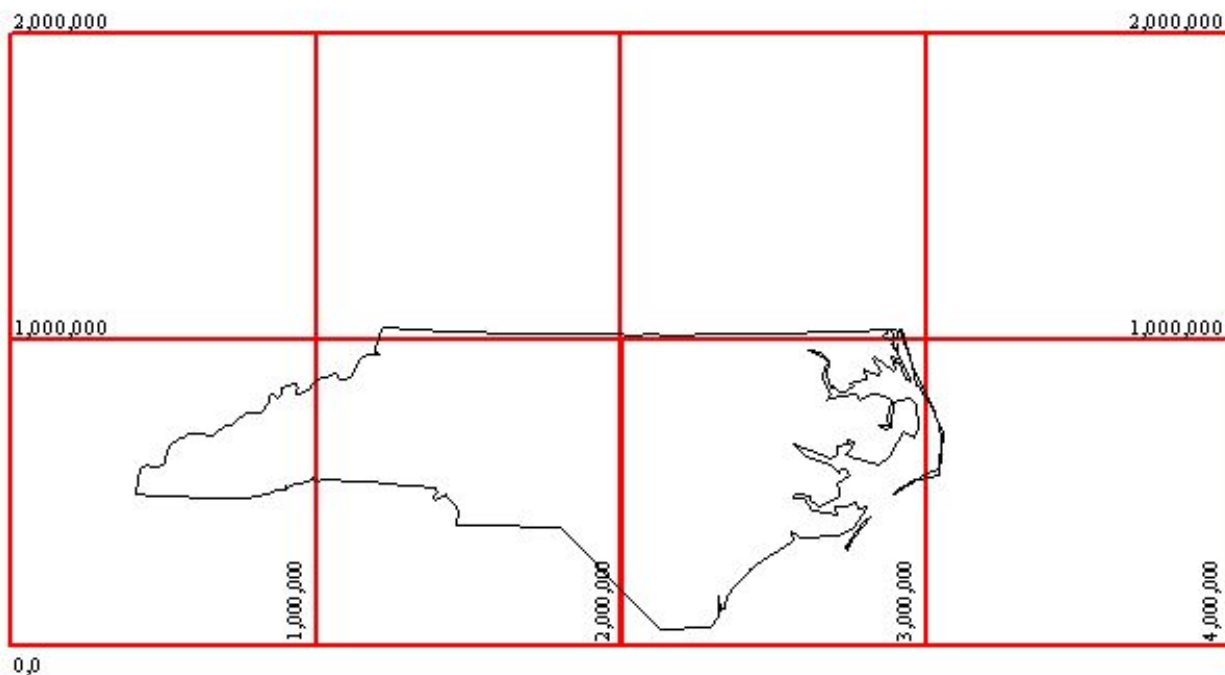
## **6.2 Base Map**

The FIRMs and FIS Report for this project have been produced in a digital format. The flood hazard information was converted to a Geographic Information System (GIS) format that meets FEMA's FIRM database specifications and geographic information standards. This information is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community. The FIRM Database includes most of the tabular information contained in the FIS Report in such a way that the data can be associated with pertinent spatial features.

The projection used in the preparation of this map was the North Carolina State Plane Coordinate System. The horizontal datum was NAD83, GRS80 spheroid. Differences in datum, spheroid, or projection used in the production of FIRMs for adjacent states may result in slight positional differences in map features across the state boundary. These differences do not affect the accuracy of this FIRM.

As part of the North Carolina CTS Initiative, North Carolina digital FIRM panel numbers are consistent with the North Carolina Land Records Management Program (LRMP).

The 11-digit digital FIRM panel numbering system for North Carolina is: SS MM LLLL PP X, where SS = State Federal Information Processing Code (37); MM = Easting-Northing (EN) 1,000,000-foot coordinates; LLLL = LRMP map numbers to include the EN 100,000-foot coordinates, and the EN 10,000-foot coordinates; PP = place holders for additional EN 1,000-foot coordinates; and X = suffix ("J" for the initial edition). North Carolina's State Plane Coordinate System origin is outside the State boundary to the southwest (in Georgia), the eastings range from approximately 0,404,000 (Tennessee border) to 3,040,000 (Atlantic Ocean); and the northings range from approximately 0,045,000 (South Carolina border) to 1,043,000 (Virginia border). Digital FIRM panels were compiled at either 1"=1,000', covering an area of 20,000 feet x 20,000 feet (20" x 20" panels); or at 1"=500', covering an area of 10,000 feet x 10,000 feet (20" x 20" panels). An additional 2 digits (both zeros) are held in reserve as a "place holder" in the event that future FIRMs are printed at a larger scale; e.g., 1"=250', covering an area of 5,000 feet x 5,000 feet for which the 1,000-foot coordinates would either be 0 or 5.



**Figure 3 - North Carolina's State Plane Coordinate System**

## 6.3 Floodplain and Floodway Delineation

### Floodplain Delineation

For streams restudied by detailed and limited detailed methods, the 1% and 0.2% annual chance floodplains were delineated using flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic data acquired using airborne Light Detection and Ranging (LIDAR). This LIDAR data was acquired during the (insert date from basin plan and update for map maintenance, if necessary) flying season.

The topographic data satisfies a vertical root-mean-square error (RMSE) accuracy standard of 20 cm (1.3 feet accuracy at the 95% confidence limit) for the Outer Banks and 25 cm (1.6 feet accuracy at the 95% confidence limit) for those portions of the basin lying west of the Outer Banks. These data could be contoured at roughly a 2-foot vertical contour interval. All elevations were referenced to the NAVD 88 and reflect orthometric heights. Variably spaced, bare-earth digital topographic data in ASCII point file format were combined with imagery (either flown concurrently with the LIDAR data or using existing digital orthophotos) to establish a Triangulated Irregular Network (TIN) of digital elevation points, which include selected breaklines to be used for hydraulic modeling. Furthermore, a uniformly spaced sampling of the TIN resulted in uniformly spaced Digital Elevation Models (DEMs), with 20 ft x 20 ft post spacing, which was generated in multiple file formats.

The 1% annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones VE, AO, AH, A99, AR, A, and AE), and the 0.2% annual chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% annual chance floodplain boundaries have been shown.

### Floodway Delineation

The floodways presented in this FIS were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 21, "Floodway Data"). The computed floodway is shown on the FIRM. In cases where the floodway and 1% annual chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown. In areas where the top of the bridge or road is higher than the 1.0-percent annual chance (100-year) flood, the FIRM will show the flood discharge as contained within the structure for emergency management purposes. It is important to note that FEMA and community floodway regulations still apply in and around those areas.

**Table 21 - Floodway Data**

Floodway Source		Floodway			Water Surface Elevation			
Cross Section	Distance (Feet Above Mouth)	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet Per Second)	Regulatory	Without Floodway	With Floodway	Increase
<b>Big Buffalo Creek</b>								

**Table 21 - Floodway Data**

Floodway Source		Floodway			Water Surface Elevation			
Cross Section	Distance (Feet Above Mouth)	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet Per Second)	Regulatory	Without Floodway	With Floodway	Increase
020	2,000	325	2,609	2.0	227.8 <sup>1</sup>	218.2	218.4	0.2
032	3,193	350	2,945	1.8	227.8 <sup>1</sup>	219.9	220.1	0.2
042	4,181	600	4,248	1.2	227.8 <sup>1</sup>	220.4	221.0	0.6
061	6,060	535	3,664	1.4	227.8 <sup>1</sup>	221.6	222.4	0.9
076	7,595	85	902	5.9	227.8 <sup>1</sup>	225.4	225.6	0.2
084	8,428	88	1,058	5.0	227.8	227.8	228.4	0.5
094	9,355	123	1,588	3.3	229.4	229.4	230.2	0.8
104	10,428	375	4,616	1.2	230.3	230.3	231.3	1.0
116	11,573	225	2,185	2.4	230.7	230.7	231.7	1.0
124	12,440	100	1,096	4.8	232.1	232.1	233.1	1.0
130	13,044	100	1,125	4.7	233.7	233.7	234.7	1.0
140	13,963	180	1,917	2.7	236.0	236.0	236.8	0.9
146	14,621	170	1,622	3.1	236.6	236.6	237.6	1.0
157	15,666	120	1,171	4.4	238.6	238.6	239.3	0.7
164	16,420	122	1,065	4.8	239.9	239.9	240.7	0.8
<b>Little Buffalo Creek</b>								
006	645	73	414	7.9	222.1 <sup>1</sup>	210.0	211.0	1.0
013	1,327	40	355	9.2	222.1 <sup>1</sup>	216.6	217.2	0.6
024	2,377	55	326	10.0	225.9	225.9	226.2	0.3
035	3,472	60	343	9.5	237.3	237.3	237.8	0.5
046	4,565	72	388	8.3	247.2	247.2	247.6	0.4
056	5,559	105	584	5.5	254.1	254.1	254.8	0.7
065	6,496	60	404	8.0	257.2	257.2	258.2	1.0
072	7,229	217	3,663	0.9	273.7	273.7	274.7	1.0
082	8,238	184	3,006	1.0	273.7	273.7	274.7	1.0
098	9,774	395	5,598	0.6	273.8	273.8	274.7	1.0
108	10,802	575	8,152	0.4	279.7	279.7	280.7	1.0
118	11,802	975	12,465	0.2	279.7	279.7	280.7	1.0
130	12,980	1,110	11,028	0.3	279.8	279.8	280.8	1.0
144	14,426	915	10,746	0.3	279.8	279.8	280.8	1.0
153	15,284	1,049	6,806	0.4	279.8	279.8	280.8	1.0
160	15,978	667	4,854	0.6	279.9	279.9	280.9	1.0
168	16,797	150	1,339	2.3	280.0	280.0	281.0	1.0
177	17,653	310	1,843	1.7	280.5	280.5	281.5	1.0
193	19,302	195	912	3.4	282.4	282.4	283.2	0.9
201	20,144	250	2,382	1.2	291.4	291.4	291.4	0.0

<sup>1</sup>Elevation includes backwater effects

## 7.0 Revising the FIS

### 7.1 Letters of Map Amendment and Letters of Map Revision - Based on

# Fill

LOMAs and LOMR-Fs are documents issued by FEMA that officially remove a property and/or a structure from a Special Flood Hazard Area (SFHA), if data supporting the removal are submitted. LOMAs and LOMR-Fs are generally determinations regarding areas that are too small to be shown on a FIRM panel; consequently, the changes they describe become official without revising the FIRM or the FIS Report.

NFIP regulations require that the lowest adjacent grade (the lowest ground touching the structure) be at or above the 1% annual chance flood elevation for a LOMA to be issued. Currently, there is no fee for FEMA's review of a LOMA request, but the requester of a LOMA is responsible for providing all the information needed for the review, which may include structure and/or property elevations certified by a licensed land surveyor or professional engineer. Therefore, LOMA requesters may need to retain the services of a land surveyor or engineer.

A LOMA cannot be used for property on which fill has been placed. For those situations, a LOMR-F must be used. As a participant in the NFIP, a local government must adopt ordinances that meet the minimum Federal floodplain management standards, which are outlined in Section 60.3 of the NFIP regulations. For a number of reasons, these ordinances generally vary from community to community. Nonetheless, because the placement of fill within the floodplain can affect flood hazards in the surrounding area, additional information is needed before FEMA can process a LOMR-F request. Among the data required for a LOMR-F is the community acknowledgment form. This form is FEMA's assurance that all appropriate Federal, State, and local floodplain management requirements have been met. Furthermore, NFIP regulations require that the lowest adjacent grade (the lowest ground touching the structure) be at or above the 1% annual chance flood elevation for a LOMR-F to be issued removing the structure from the floodplain. Because LOMR-F requests are the result of changed physical conditions rather than limitations of scale or topographic definition, FEMA charges a fee for the review of a LOMR-F request. As with the LOMA, the requester of a LOMR-F is responsible for providing all supporting information, including structure and/or property elevation data.

In cases where property owners plan to add fill in the SFHA, NFIP regulations require plans and technical information to be submitted for review by FEMA before construction takes place. FEMA will issue a conditional LOMR-F stating how flood hazards would change and what portions of the property, if any, would remain in the SFHA if the project were built according to the submitted plans.

The issuance of a LOMA or LOMR-F ends the property owner's obligation to purchase flood insurance as a condition of Federal or federally backed financing. However, the property owner's mortgage company maintains the prerogative to require flood insurance as a condition of providing financing. Before attempting to obtain a LOMA or LOMR-F, property owners are advised to consult their mortgage companies regarding this policy. Even if the mortgage company indicates that it will require flood insurance if a LOMA or LOMR-F is issued, it may be advantageous for property owners to request a LOMA or LOMR-F because flood insurance premiums are lower for properties removed from the SFHA than for properties that remain within the SFHA.

For additional information regarding LOMAs, LOMR-Fs, conditional LOMR-Fs, or current application fees, please call the FEMA Map Information eXchange (FMIX) toll-free information line at 1-877-FEMA MAP (1-877-336-2627).

## 7.2 Letters of Map Revision

A Letter of Map Revision (LOMR) is a document issued by FEMA and the NCFMP that revises an FIS Report and/or FIRM. A LOMR is used to change flood risk zones, floodplain and/or floodway delineations, flood elevations, or planimetric features such as road systems or corporate limits. A LOMR provides FEMA and the NCFMP with a cost-effective means of revising the FIS information without physically changing and reprinting the map or report itself. A portion of the FIRM panel or FIS Report showing the revised information is issued with the LOMR. The LOMR is sent to all affected communities and is archived in the communities' NFIP map repository for public reference.

In cases where a proposed project (such as construction in the 1% annual chance floodplain) would result in a significant rise in 1% annual chance water-surface elevations, NFIP regulations require the community to submit plans and technical information for review by FEMA and the NCFMP before construction takes place. This assures communities participating in the NFIP that proposed projects meet minimum NFIP requirements. The result of FEMA and the NCFMP reviews is documented in a conditional LOMR.

For additional information regarding LOMRs, conditional LOMRs, or current application fees, please call the FEMA Map Assistance Center toll-free information line at 1-877-FEMA MAP (1-877-336-2627) or the NCFMP at 919-715-5711.

## 7.3 Physical Map Revisions

Physical Map Revisions (PMRs) are processed to incorporate information concerning conditions present in the community that are not reflected in the

FIS, and involve distributing republished FISs that supersede the most current NFIP data in the community repository. PMRs may be initiated by a request from a community resident or agency, or FEMA may initiate a PMR to incorporate one or more LOMRs, to reflect significant changes in corporate limits, to correct errors, or to update flood hazards to match new information from an adjacent community's FIS. Due to the costs associated with updating and distributing FISs, map revisions will be processed as LOMRs rather than PMRs whenever possible. For more information regarding PMRs, please contact the FEMA Map Information eXchange (FMIX) toll-free information line at 1-877-FEMA MAP (1-877-336-2627), the FEMA Regional Office at the address listed on the Notice to Flood Insurance Study Users page at the front of this report, or the NCFMP at 919-715-5711.

## 7.4 Contracted Restudies

The NFIP provides for a periodic review and restudy of flood hazards in a given community. FEMA accomplishes this through a national mapping needs assessment process that assigns priorities and allocates funds to sponsor or subsidize new flood hazard analyses used to update FIS Reports. For map maintenance restudies within the state of North Carolina, scoping will be performed by county approximately 2.5-3.5 years after the previous effective date. Scoping will focus on streams with restudy needs within those previously effective counties rather than on full countywide restudies. A restudy refers specifically to updating or reevaluating engineering analyses that were performed for a flood mapping project that directly impact BFEs and/or flood hazard boundary extents or analysis of previously unstudied flood prone areas. Restudy project evaluation triggers and prioritization values are an essential component of the map maintenance program. For more information regarding NCFMP-contracted restudies, please contact the NCFMP at 919-715-5711 or at [www.ncfloodmaps.com](http://www.ncfloodmaps.com). For more information regarding FEMA-contracted restudies, please contact the FEMA Map Information eXchange (FMIX) toll-free information line at 1-877-FEMA MAP(1-877-336-2627) or the FEMA Regional Office at the address listed on the Notice to Flood Insurance Study Users page at the front of this report.

## 7.5 Map Revision History

The current FIRM is a subset of the Statewide FIRM, showing flood hazard information for the entire geographic area of Lee County. Previously, separate Flood Hazard Boundary Maps (FHBMs), Flood Boundary and Floodway Maps (FBFMs), and/or FIRMs were prepared for each identified flood prone jurisdiction within the county. Historical data relating to the NFIP maps prepared for each community prior to and including the 9/6/2006 North Carolina Statewide FIRM, which includes Lee County, are presented in Table 22, "Community Map History."

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Lee County has been compiled into this FIS. Therefore, this FIS supersedes all previously printed FIS Reports, FHBMs, FIRMs, and/or FBFMs for all of the incorporated and unincorporated jurisdictions within Lee County.

**Table 22 - Map Revision History**

Community	Initial Identification Date	Initial FIRM Effective Date	FIS Revision Date
CITY OF SANFORD	6/30/1978	9/6/1989	09/06/2006
LEE COUNTY	6/30/1978	9/6/1989	09/06/2006
TOWN OF BROADWAY	6/30/1978	9/6/2006	09/06/2006

# 8.0 Study Contracting and Community Coordination

## 8.1 Authority and Acknowledgments

The sources of authority for this FIS are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

This FIS revises and updates the previous countywide FIS for the geographic area of Lee County and Incorporated Areas. Table 23, "Authority and Acknowledgments," includes information for the previous countywide FIS and for this revision. This table also includes information for the single-jurisdiction FISs published for each community included in this countywide FIS (if available) as compiled from their previously printed FIS Reports

**Table 23 — Authority and Acknowledgments**

Community	FIS Dated	Study Contracted By	Data Source	Contract or IAA Number	Work Completed In
CITY OF SANFORD	9/6/2006	NCFMP	NCFMP	286-0000-23	8/8/8888
LEE COUNTY	9/6/2006	NCFMP	NCFMP	286-0000-23	8/8/8888
TOWN OF BROADWAY	9/6/2006	NCFMP	NCFMP	286-0000-23	8/8/8888

This FIS Report was produced through a unique cooperative partnership between the State of North Carolina and FEMA. The State of North Carolina, through FEMA's Cooperating Technical Partner (CTP) Initiative, has become the first Cooperating Technical State (CTS) and will assume primary ownership of the NFIP FIRM panels for all North Carolina communities. This role has traditionally been fulfilled by FEMA. The North Carolina Floodplain Mapping Program is conducting flood hazard analyses and producing updated, digital FIRM panels. The hydrologic and hydraulic analyses and the FIRM panels for the initial statewide mapping for Lee County were produced by NCFMP under contract with the State of North Carolina and issued on effective 8/30/2013. For this revision, the hydrologic and hydraulic analyses and the FIRM panels were produced by NCFMP, under contract with the State of North Carolina.

## 8.2 Consultation Coordination Officer's Meetings/Scoping Meetings

In general, for each FIS an initial Consultation Coordination Officer's (CCO) meeting is held with representatives from FEMA, the communities, and the study contractors to explain the nature and purpose of the FIS and to identify the streams to be studied by detailed methods. A final CCO meeting is held with representatives from FEMA, the communities, and the study contractors to review the results of the study

Table 24, "Consultation Coordination Officer's Meetings" is not applicable in Lee County.

For each FIS produced during the initial phase of statewide, an Initial Scoping Meeting was held with representatives from FEMA, the county, the incorporated communities, and the State of North Carolina. A Final Scoping meeting was held to review the Draft Basin Plan and finalize the streams to be studied by detailed methods. This information was then used to create the Final Basin Plan.

For map maintenance revisions, only one scoping meeting was held to identify the streams to be newly studied by detailed methods, redelineated, or to be studied by limited detailed methods. This information was then used to create the Map Maintenance Plan.

The historical dates of the Initial and Final Scoping Meetings held during the first round of statewide mapping for Lee County are shown in Table 25, "Scoping Meetings." Meetings held for the map maintenance revision are also included below for Lee County.

**Table 25 — Scoping Meetings**

Community	Riverbasin	Initial Scoping Date	Attended By	Final Scoping Date	Attended By
CITY OF SANFORD	CAPE FEAR	12/7/2000	Representatives of FEMA, Dewberry & Davis, LLC, and community officials	3/6/2001	Representatives of FEMA, Dewberry & Davis, Greenhorne & O'Mara, NCEM, LLC, and community officials
CITY OF SANFORD ETJ	CAPE FEAR	12/7/2000	Representatives of FEMA, Dewberry & Davis, LLC, and community officials	3/6/2001	Representatives of FEMA, Dewberry & Davis, Greenhorne & O'Mara, NCEM, LLC, and community officials
LEE COUNTY	CAPE FEAR	12/7/2000	Representatives of FEMA, Dewberry & Davis, LLC, and community officials	3/6/2001	Representatives of FEMA, Dewberry & Davis, Greenhorne & O'Mara, NCEM, LLC, and community officials
TOWN OF BROADWAY	CAPE FEAR	12/7/2000	Representatives of FEMA, Dewberry & Davis, LLC, and community officials	3/6/2001	Representatives of FEMA, Dewberry & Davis, Greenhorne & O'Mara, NCEM, LLC, and community officials
TOWN OF BROADWAY ETJ	CAPE FEAR	12/7/2000	Representatives of FEMA, Dewberry & Davis, LLC, and community officials	3/6/2001	Representatives of FEMA, Dewberry & Davis, Greenhorne & O'Mara, NCEM, LLC, and community officials

Preliminary Meetings are held in each county to disseminate and review the FIS Report and FIRM panels. This meeting is required by FEMA. Public Participation Meetings are not required by FEMA, but provide an opportunity to review and discuss the FIS Report and FIRM panels for each jurisdiction in a public setting. The dates for the preliminary and public participation meetings are shown in Table 26, "Preliminary and Public Participation Meetings."

**Table 26 — Preliminary and Public Participation Meetings**

Community	For FIS Dated	Meeting Location	Preliminary Meeting Date	Attended By	Public Meeting Date	Attended By
CITY OF SANFORD	9/6/2006	City of Sanford	10/5/2005	Officials from Lee county and NCDEM	10/26/2005	The Public
CITY OF SANFORD ETJ	9/6/2006	City of Sanford	10/5/2005	Officials from Lee county and NCDEM	10/26/2005	The Public

## 9.0 Guide to Additional Information

Information concerning the pertinent data used in the preparation of this FIS Report can be obtained by submitting an order with any required payment to the FEMA Engineering Library. For more information on this process, see <http://www.fema.gov>.

The Map Repositories table below lists locations where FIRMs for Lee County can be viewed. Please note that the maps at these locations are for reference only and are not for distribution. Also, please note that only the maps for the community listed in the table are available at that particular repository. A user may need to visit another repository to view maps from an adjacent community.

**Table 27 — Map Repositories**

Community	Address	City	State	Zip Code
Town of Broadway	Town Hall, 117 South Main Street	Broadway	NC	27505
Lee County	Planning Department, 900 Woodland Avenue	Sanford	NC	27331
City of Sanford	Planning Department, 900 Woodland Avenue	Sanford	NC	27331

## 9.1 Additional Information

All FIRM panels created for the State of North Carolina are produced in a seamless statewide format; however, FIS Reports are produced for individual counties.

Copies of FIRM panels are available for a nominal fee. To obtain a copy of the current flood map for a specific community, contact the FEMA Map Service Center at 1-800-358-9616. To facilitate the processing of your request, please review the current flood map on file at your local community repository and obtain the panel number in which you are interested. If necessary, users may also order a FIRM Index from the Map Service Center to determine the appropriate panel numbers. The Map Service Center also accepts orders for the Community Status Book and the Flood Insurance Manual. The FIS Report, FIRM panels, and digital data used to produce the FIRM panels are available online at [www.ncfloodmaps.com](http://www.ncfloodmaps.com).

Information concerning the data used in the preparation of this FIS, contained in an Engineering Study Data Package, may be obtained by contacting the FEMA Regional Office at the address listed on the Notice to Flood Insurance Study Users page at the front of this report.

Table 28, "Additional Information" is not applicable in Lee County.

## 10.0 Appendix

### 10.1 Bibliography

All bibliography and reference information associated within this Flood Insurance Study are maintained and accessible within the geodatabase structure and associated metadata. Users requiring more specific information should contact the North Carolina Floodplain Mapping Program (NCFMP) at [www.ncfloodmaps.com](http://www.ncfloodmaps.com) under the Contacts menu